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LIFE SCIENCES

BIOMEDICAL AND BEHAVIORAL SCIENCES

No. 31

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UDC 633.1:576.354.4

PRIMARY OCTOPLOID TRITICALE, MEIOSIS STABILITY AND SELECTION

Moscow GENETIKA in Russian Vol 18, No 4, Apr 82
(manuscript received 22 Jan 81) pp 652-660

FEDOROVA, T. N., Scientific Research Institute of Central Rayons Agriculture of Nonchernozem Zone, Moskovskaya Oblast'

[Abstract] The goal of the present work was to find out about the possibilities of selection for meiosis in octoploid triticale C_1-C_2, i.e., in the first-second generation after doubling of amphihaploid chromosomes. Meiosis and productivity of main spike were studied in each C_1 plant and in their C_2 generation. Productivity of C_2 spikes was found to be lower than in the starting plants. A high degree of variation was observed in productivity of these spikes, which was independent of the regularity of meiosis. This supports the independent action of genetic factors controlling these indices. This high variability coupled with independent action of genes controlling meiosis and fertility of triticale makes it possible to select plants with optimal combination of these factors. It was concluded that the degree of bivalent conjugation of chromosomes cannot serve as a criterion for selection either in the first or second generation of octoploid triticale. References 28: 9 Russian, 21 Western (2 by Russian authors).
[128-7813]

UDC 575.173:575.127

CHROMOSOMAL CONTROL OF ALCOHOLDEHYDROGENASE, ESTERASE AND β-AMYLASE ISOENZYMES IN VARIOUS BRANDS OF RYE

Moscow GENETIKA in Russian Vol 18, No 4, Apr 82
(manuscript received 10 Jun 80; after final revision 19 Jun 81) pp 661-667

ARTEMOVA(KUDRYAKOVA), N. V., All-Union Scientific Research Institute of Plant Breeding imeni N. I. Vavilov, Leningrad

[Abstract] In the present work results are reported on the identification of chromosomes 4R/7R, 5R and 6R controlling isoenzymes alcoholdehydrogenase, β-amylase and esterase in four brands of rye: King II, Dakold, Petcus and Imperial. It also includes data on chromosome control of some components of β-amylase in Kharkov brand of wheat. The most complete results were obtained for alcoholdehydrogenase. The single molecular form of this enzyme was controlled with rye gene Adh-RI which in King II and Dakold brands was localized on chromosome 4R/7R, in Petcus - on 4R and in Imperial - on 7R/4R chromosome. The difference observed assumes translocation between chromosomes 4R/7R and 7R/4R which makes them only partially identical to chromosomes of other brands. Chromosome 6R participated in control of the synthesis of esterase isoenzymes in all brands except for Petcus, where absence of addition line on chromosome 6R made it impossible to reach a definite conclusion on the localization of esterase genes. Analysis of β-amylase isoenzymes identified involvement of 5R chromosome in control of the synthesis of some components in 3 out of the 4 brands studied. Isoenzymes of Kharkov wheat were controlled by chromosomes of 4th homeologic group. In general, the analytical results show that these isoenzymes could be used in preliminary identification of rye chromosomes in addition and substitution wheat-rye lines and in triticale. Figures 3; references 11: 1 Russian, 10 Western.
[128-7813]

UDC 577.157.08:577.150.14

REVERSE INHIBITOR TITRATION OF ACTIVE SITES IN ENZYMES. DIPEPTIDYL-CARBOXYPEPTIDASE--INHIBITOR OF SQ 20881 FROM BOTHROPS JARARACA SNAKE VENOM

Moscow BIOKHIMIYA in Russian Vol 47, No 8, Aug 82
(manuscript received 22 Jun 81) pp 1332-1337

LARIONOVA, N. I., MASLOV, Ye. V., YELISEYEVA, Yu. Ye. and PAVLIKHINA, L. V., Chemical Faculty of the Moscow State University imeni M. V. Lomonosov and Institute of Biological Chemistry, USSR Academy of Medical Sciences, Moscow

[Abstract] Current methods for determination of the concentration of active sites in enzymes are based on the use of substrate-titrants or on irreversible or reversible inhibitors. The goal of the present study was to develop methods to determine concentrations of the active sites in dipeptidylcarboxypeptidase using the reversible inhibitor method. Stoichiometric titration was performed under conditions of steady, high concentration of the enzyme (5×10^{-8} to 10^{-6} M), varying the concentration of inhibitor SQ 20881 (>Glu-Trp-Pro-Arg-Pro-Glu-Ile-Pro-Pro). The sensitivity of the selected method depends on the inhibition constant K_i. In the present study a method based on determination of final enzymic activity after reaching an equilibrium in the enzyme-inhibitor system was used. From the kinetic data obtained it was shown that the complex enzyme-inhibitor forms a 1:1 ratio. The weak point of this method was that at high concentrations of the enzyme the determination of the final enzymic activity had to be done within 2-20 min, leading to greater experimental errors. The following values were obtained for the kinetic and equilibrium constants: $k_1 = 3.2 \times 10^6 M^{-1}s^{-1}$, $k_{-1} = 8\ ms^{-1}$ and $K_i = 2.5 \pm 0.5$ nm. Figures 3; references 15: 5 Russian, 10 Western.
[197-7813]

UDC 575.1:576.851.48

INTENSIFICATION OF DNA REPAIR PROCESSES IN ESCHERICHIA COLI K-12 WITH PARAAMINOBENZOIC ACID

Moscow GENETIKA in Russian Vol 18, No 3, Mar 82
(manuscript received 7 Aug 80; after completion 20 May 81) pp 381-391

VASIL'YEVA, S. V., DAVNICHENKO, L. S. and RAPOPORT, I. A., Institute of Chemical Physics, USSR Academy of Sciences, Moscow

[Abstract] DNA repair system functions were studied on Escherichia Coli upon introduction of a specific factor capable of active interaction with genetic apparatus: p-aminobenzoic acid (PABA). PABA intensifies DNA repair processes without causing any chromosomal rearrangements and mutations. It became apparent that lethal action of high doses of PABA depended on the activity of the enzyme repair system of DNA and on individual sensitivity of cell genome. Tolerance levels of various strains of E. coli towards PABA were determined. It was shown that bacterial cells with an intact DNA repair system pretreated with PABA showed a more effective reaction towards the mutagenic action of N-nitroso-N-methylurea (NMU), N-nitroso-N-ethylurea (NEU) methylmethanesulfonate (MMS) and ethylmethanesulfonate (EMS). A somewhat weaker reaction was found on concurrent administration of PABA and the mutagens. In vitro experiments showed no chemical reaction of PABA with MMS or NMU. The ability of PABA to normalize genetic processes in cells subjected to action of chemical mutagens shows up selectively in bacterial strains with dominant or recessive allelomorphs of DNA repair genes and are manifested in the form of lesser premutational damage in the cells. Figures 6; references 19: 6 Russian (1 by Western authors), 13 Western. [129-7813]

UDC 575.24:576.851.48

GENETIC ACTIVITY OF PARAAMINOBENZOIC ACID. INTENSIFICATION OF DNA-POLYMERASE-1-DEPENDENT REPAIR INDUCED BY CHEMICAL MUTAGENS IN TOLUENE TREATED ESCHERICHIA COLI CELLS

Moscow GENETIKA in Russian Vol 18, No 3, Mar 82
(manuscript received 19 Sep 80) pp 392-398

VASIL'YEVA, S. V., TONKAL', T. Ye., GORODETSKIY, S. I. and RAPOPORT, I. A., Institute of Chemical Physics, USSR Academy of Sciences, Moscow

[Abstract] Toluene treated (permeabilized) bacterial cells represent a good model for studying the variability of DNA repair processes. This pseudo-in vivo system makes it possible to study repair phenomena related to each of the three DNA polymerases independently. Treatment of the cells with toluene makes them permeable to nucleosidetriphosphates and other low molecular substances so that the pool of precursors and cofactors can be kept

under controlled conditions. The effect of p-aminobenzoic acid (PABA) on the repair processes related to DNA-polymerase-1 (DNA-Pol-1) was studied on E. coli K-12 cells treated with alkylating agents. PABA was found not to induce DNA-Pol-1 directed repairs, but intensified them when used concurrently with N-nitroso-N-methylurea (NMU), N-nitroso-N ethylurea (NEU) and ethylmethanesulfonate (EMS) by factors of 2.0, 1.2 and 2.8 respectively. These results have shown that PABA is capable of normalizing genetic structure of DNA subjected to alkylating agents. This intensified reparative synthesis of DNA in presence of PABA further suggested the concept of reparagenic activity of the latter, discovered in previous studies. Figures 6; references 13: 4 Russian, 9 Western.
[129-7813]

UDC 576.852.2.095.383:547.915

PIGMENTED BIOPOLYMER WITH AMPHIPHILIC PROPERTIES FROM CELLS OF MARINE MYCOBACTERIA

Moscow MIKROBIOLOGIYA in Russian Vol 51, No 5, May 82
(manuscript received 21 Aug 81) pp 873-875

KUPONELLI, T. V., PAICHLAVUNI, I. K. and ROZYNOV, B. V., Moscow State University imeni M. V. Lomonosov

[Abstract] A pigmented peptidolipid was isolated from cells and culture fluid of the hydrocarbon-oxidizing marine bacterium, Mycobacterium brevicale 32-MCT. The raspberry-red substance was obtained in pure form by chromatography on a silica gel column. The IR spectrum revealed bands at 1665 cm^{-1} and 1555 cm^{-1} with a small peak in the carbonyl absorption region (1740 cm^{-1}). Thin-layer chromatography of the alkali hydrolysate revealed that the lipid fraction contains higher fatty acids (primarily palmitic) and mycolic acids (primarily $C_{34:0}$ and $C_{34:1}$), linked with peptide, and pigment. The pigment portion of the biopolymer was a ketocarotenoid with a carbonyl group coupled to the polyene system of the pigment molecule. The amphiphilic nature and solubilities of the compound were determined by the presence of the fatty and mycolic acids, and its high adsorption on silica gel by polar groups. Comparison of soil and marine hydrocarbon-oxidizing mycobacteria revealed that marine, but not soil, strains produced a raspberry-colored peptidolipid. Figure 1; references 4: 3 Russian, 1 Western.
[191-9307]

UDC 547.963.3:576.858

VIRAL SEQUENCES IN GENOME OF RAT AND HAMSTER CELLS TRANSFORMED BY SIMIAN ADENOVIRUS SA7(C8) AND ITS DNA

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 16, No 3, May-Jun 82
(manuscript received 30 Jun 81) pp 519-527

GARTEL', A. L., CHAPLYGINA, N. M., PONOMAREVA, T. I., TYUNNIKOV, G. I., DREYZIN, R. S. and TIKHONENKO, T. I., Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow

[Abstract] Sequences of adenovirus SA7 DNA and their expression were studied in cell lines PK-2 and 412, obtained by treating a rat kidney primary cell culture with adenovirus SA7 and its DNA, respectively, and in cell lines 150 and D-2, obtained from hamster tumors induced by SA7 and its DNA, respectively. Cell morphology was typical for adenovirus-transformed cells. Quantitative analysis of viral sequences by molecular hybridization on nitrocellulose filters revealed that the genome of PK-2 cells contained sequences homologous to SalGI-fragments A, C and D of SA7 DNA. DNA from 412 cells contained sequences homologous to all SalGI fragments of SA7 DNA; 75-100% of most SalGI fragments were present with the exception of SalGI-D. DNA of 150 cells did not contain the sequence homologous to SalGI fragment B of SA7 DNA, and D-2 cells contained only sequences homologous to the left end of SalGI fragment C of SA7 DNA. Thus, all cell lines contained sequences homologous to the left end of SalGI fragment C (19% of genome). Hybridization of cell DNA with BglII fragments C, D, E and F of SA7 DNA showed that the DNA of lines 412 and 150 hybridized with all BglII fragments. PK-2 DNA contained sequences homologous to BglII fragments D, E and F. D-2 DNA hybridized with BglII fragments D and F (10% of SA7 genome from the left end). Hence there were no major differences between transformed and tumor cells, although they did differ in the quantity of viral sequences. Cells contained only a few copies of viral sequences (0.2-2.5 copies per diploid cell genome). Cells of line 412 contained 7-15 copies of sequences homologous to all SA7 fragments per diploid cell genome. Transcription of viral sequences was also studied by hybridizing cytoplasmic [^{3}H]RNA with SA7 BglII fragments. [^{3}H]RNA from all four lines hybridized with BglII fragment D, which contains the entire EI operon. Hybridization of [^{3}H]RNA with other BglII fragments depended on cell line. The integration of the DNA of the highly oncogenic simian adenovirus SA7 in the genome of transformed and tumor cells is similar to that for non-oncogenic human adenoviruses. Results obtained by molecular hybridization and by determining reassociation kinetics were highly similar, so that the technique of molecular hybridization can be recommended for semiquantitative evaluation of viral sequences in transformed cells. Figures 6; references 39: 10 Russian, 29 Western. [193-9307]

UDC 547.963.3:576.858.9

TRANSFECTION OF BACTERIAL CELLS BY PHAGE M13 DNA ENCLOSED IN PHOSPHOLIPID VESICLES

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 16, No 3, May-Jun 82 (manuscript received 10 Aug 81) pp 612-618

BELYAYEV, N. D., BUDKER, V. G., MAKSIMOVA, T. G., NAUMOVA, L. P. and SOKOLOV, A. V., Novosibirsk Institute of Organic Chemistry, Siberian Branch of the USSR Academy of Sciences, Novosibirsk

[Abstract] The possible transfer of nucleic acids in procaryotic cells was studied in a transfection system consisting of Escherichia coli EMN and phage M13 single-stranded DNA enclosed in liposomes. Two techniques were used to obtain phosphatidylcholine liposomes: ultrasonication of phosphatidylcholine in a nucleic acid solution and a modified ether injection method. The first method produced monolayer vesicles with an average diameter of ~400Å and the second, vesicles with a diameter of ~3000Å. The amount of DNA enclosed in liposomes was determined by DNAase I hydrolysis of free DNA and by separation of DNA and liposomes on DEAE Sephadex A-25. DNAase I was found to be inactive at high liposome concentrations; this was due to the inaccessibility of polynucleotides within the membrane complexes to the enzyme. Removal of free DNA on Sephadex was effective only in the absence of bivalent ions (Mg^{2+} and Ca^{2+}). At a phosphatidylcholine concentration of 10 mg/ml, liposomes obtained by sonication captured about 1% of DNA and ether liposomes 10-15% of DNA. DNA from ether liposomes was similar to the original DNA, b t only a small portion of DNA in sonicated liposomes remained intact. DNA from ether liposomes retained the infectivity of the original DNA, whereas the infectivity of DNA from sonicated liposomes was about 1% of the original. Preliminary experiments on the transfer of [^{3}H]poly(U) in liposomes into E. coli cells showed that pretreatment of cells with Ca^{2+} was necessary for effective transfer. This also applied to liposomes with phage DNA. Transfection efficiency was much higher for sonicated than for ether liposomes. Transfection was two orders of magnitude higher for sonicated liposomes than for DNA isolated from them, whereas transfection was an order of magnitude lower for ether liposomes in comparison with their DNA. Transfection did not depend on the concentration of DNA-carrying liposomes, but was limited by the availability of binding sites on the cell surface. Transfection effectiveness comprised 10^6 plaque-forming units/μg of DNA. A mechanism is suggested for transfection on the basis of findings. Figures 3; references: 15 (Western).
[193-9307]

UDC 547.963.3

USE OF NUCLEASE S1 TO DETERMINE MOLECULAR WEIGHT OF DNA IN MULTIPLASMID *Escherichia coli* STRAINS

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 16, No 3, May-Jun 82
(manuscript received 24 Jun 81, after revision 16 Sep 81) pp 633-636

DRYGIN, Yu. F. and ZVEREV, V. V.*, Interfaculty Problem-Solving Scientific Research Laboratory of Molecular Biology and Bioorganic Chemistry imeni A. N. Belozerskiy, Moscow State University imeni M. V. Lomonosov; *Institute of Molecular Genetics, USSR Academy of Sciences, Moscow

[Abstract] Determining the molecular weight of several plasmids concurrently was a problem encountered in studying new colicinogenic factors used as possible vector DNA in genetic engineering. A rapid method based on gel electrophoresis and electron microscopy was developed to determine the number and molecular weight of plasmids, regardless of size, in multiplasmid *Escherichia coli* strains: CA23 (ColD, ColX), CA31 (ColA), CA58 (ColH), K235 (ColK, ColX), and C600. To measure length, plasmid DNA was transformed from its supercoiled form to an open ring by treatment with pancreatic DNAase or endonuclease S1. Pancreatic DNAase was found to be unsuitable since small plasmids (<2,000,000 daltons) remained supercoiled and large plasmids (≥25,000,000 daltons) were transformed into linear fragments. The desired result was achieved with endonuclease S1. The kinetics for the supercoil-open ring transition did not depend on plasmid molecular weight. Comparison of electrophoregrams of the original and endonuclease S1-treated plasmids clearly differentiated plasmid and chromosomal DNA and RNA. Plasmid molecular weights were found to range from $1.1 \cdot 10^6$ to $61 \cdot 10^6$. Figures 5; references 10: 2 Russian, 8 Western.
[193-9307]

UDC 547.963.32

ISOLATION AND PROPERTIES OF DNA POLYMERASE FROM EXTREMELY THERMOPHILIC BACTERIUM THERMUS RUBER

Moscow BIOKHIMIYA in Russian Vol 47, No 11, Nov 82
(manuscript received 4 Sep 81) pp 1785-1791

KALEDIN, A. S., SLYUSARENKO, A. G. and GORODETSKIY, S. I., Institute of General Genetics, USSR Academy of Sciences, Moscow

[Abstract] A six step procedure is described for the isolation of DNA polymerase from the extremely thermophilic bacterium Thermus ruber. The final product, free of endo- and exonuclease activities, was electrophoretically homogenous, with a MW of 70,000 daltons, that retained 90% of its activity after 2 h at the optimum temperature of 70°C (activity range 50-85°C). Maximum activity required the presence of 15 mM K+ and Na+ and 2.5 mM Mg++; Mn++ was less effective than Mg++, and Ca++ and Zn++ were ineffective. On a template of poly(rA)-oligo$(dT)_{10}$ a temperature of 50°C and a pH of 7.5 were required for maximum activity. The properties of this enzyme were compared with analogous enzymes isolated from E. coli and Thermus aquaticus. Figures 4; references 23: 2 Russian, 21 Western. [186-12172]

UDC 577.156

EXTRACELLULAR SERINE PROTEINASE FROM BACILLUS LICHENIFORMIS

Moscow BIOKHIMIYA in Russian Vol 47, No 11, Nov 82
(manuscript received 24 Sep 81) pp 1825-1829

AKPAROV, V. Kh. and STEPANOV, V. M., All-Union Scientific Research Institute of Genetics and Selection of Industrial Microorganisms, Moscow

[Abstract] Extracellular serine proteinase from Bacillus licheniformis was isolated by means of affinity chromatography on a column of CH-Se-pharose with covalently bound n-(ω-aminomethyl)phenylboric acid. The use of an adsorbent

specific for the enzyme active site resulted in a 35-fold purification of the proteinase and an activity yield of 288%. Three isozyme forms detected electrophoretically were attributed to partial deamidation of the asparagine or glutamine moieties since no differences in the amino acid sequences could be established. In addition, identical amino acid sequence was also exhibited by the subtilisin isolated from B. subtilis. Such similarity, if confirmed, would indicate an unusual degree of conservatism with respect to the subtilisins produced by the different species of Bacillus. Figures 2; references 16: 6 Russian, 10 Western.
[186-12172]

UDC 502.753 (47 + 57)

METAL CONTENT IN LEAVES OF TREES IN CITIES

Leningrad BOTANICHESKIY ZHURNAL in Russian Vol 67, No 11, Nov 82
(manuscript received 23 Nov 81) pp 1533-1539

PARIBOK, T. A., SAZYKINA, N. A., TEMP, G. A., TROITSKAYA, Ye. A., LEINA, G. D. and CHERVYAKOVA, E. G., Botanical Institute imeni V. L. Komarov, USSR Academy of Sciences, Leningrad

[Abstract] A determination was made of the content of iron, manganese, titanium, lead, copper, nickel, chromium, cobalt, strontium and barium in the leaves of Quercus robur L., Tilia cordata Mill. and Acer platanoides L. growing in Leningrad and its environs. The study was conducted in order to clarify the specific features of metal buildup in tree leaves for the purpose of indicating environmental pollution by metals and obtain data on mineral exchange in these metals. Investigations were done in parks outside and inside Leningrad that form an ecologic series reflecting the gradual increase of urbanization and industrial and transportation effects, ranging from 80 kilometers distance from the city to a park in the center of the city. Metal content was also determined in the top (0-7 centimeters) of the soil. Iron, titanium, lead and chromium content in leaves increased as a function of diminishing distance from the city; manganese content increased with distance from the city and decreased as iron content increased. Copper and nickel contents increased sharply in close-in urban parks. Small amounts of cobalt were found in leaves of Tilia cordata Mill. outside the city, and in larger amounts inside the city; inside the city cobalt was also found in Quercus robur L. Strontium and barium were detected in a complex pattern. The lead and iron contents were the greatest in all three species, followed by chromium, nickel and copper. The different metal contents in different species are discussed. Metal contents in soil increased as a function of atmospheric pollution. While the small amounts of metals found in the study constitute one of the specific features of the urban environment, it is concluded that they do not determine the condition of plants in cities, which is of decisive importance for both individual trees and species given the effect of the high concentrations of metals in the air and soil in the vicinity of major metallurgical enterprises. Figure 1; references 39: 20 Russian, 2 Polish, 17 Western. [54-9642]

UDC 582.282.23.093.6:577.472(28)

YEAST LEVELS IN WATER OF SOUTHERN LAKE BAYKAL OVER THE COURSE OF A YEAR

Moscow MIKROBIOLOGIYA in Russian Vol 51, No 5, May 82
(manuscript received 22 Apr 81) pp 860-865

MAKSIMOVA, E. A., MAKSIMOV, V. N. and KOLESNITSKAYA, G. N., Scientific Research Institute of Biology at Irkutsk State University

[Abstract] The seasonal dynamics of yeast distribution in the water layer (0-700 m) in unpolluted areas and areas polluted by the discharge of wastes from the Baykal Pulp and Paper Plant were studied in southern Lake Baykal in 1978-1979. Seasonal dynamics were characterized by an annual minimum in February when water was covered by ice, two population peaks in spring and fall (October), and a minor peak in June. As water circulation improved in spring, yeast populations comprised 40 cells/liter of water in the 0-500 m layer at end of May and 90 cells/liter of water in the 0-200 m layer at beginning of June. The yeast population increased from deeper to surface layers in summer and by August they comprised 111 cells/liter. By September the yeast population (690 cells/liter) was confined primarily to the warmer surface layers. In October the yeast population varied from 825-1680 cells cells/liter at the surface and to 2000 cells/liter at 20 m. Population levels declined after the fall peak, and yeasts were uniformly distributed in the water column (40 cells/liter) except for the surface layers (1000 cells/liter). Comparison of open and coastal waters showed that the yeast population was higher in polluted than in unpolluted areas. Yeast numbers in the waste discharge area in winter varied from 0 to 200 cells/liter in the surface layer and 14 to 85 cells/liter in the 35-m layer. In summer numbers varied from 0 to 2000 cells/liter. Highest numbers were noted directly in and to the east of discharge pipes. This was attributed to the large-scale use of yeasts by the paper plant itself, discharge from bread-baking and milk processing plants and domestic sewage. Yeast species diversity was lower in polluted water, which was characterized by four yeast species (two Cryptococcus, Rhodotorula, and Trichosporon spp.). The effect of food availability, competition with saprophytes and water currents on yeast populations and distribution are briefly discussed. Because of their low numbers and biomass, yeasts were believed to play a minor role in the cycling of matter in the oligotrophic ecosystem. Figure 1; references: 15 (Russian).
[191-9307]

UDC: 616.993.161-036.2+616.993.161:313:13](47+57)

EPIDEMIOLOGIC EVALUATION OF DATA ON HUMAN LEISHMANIOSES MORBIDITY IN THE USSR

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian
Vol 60, No 6, Nov-Dec 82 (manuscript received 5 Oct 81) pp 49-52

KELLINA, O. I. and MOROZOV, V. I., Institute of Medical Parasitology and Tropical Medicine imeni Ye. I. Martsinovskiy, USSR Ministry of Health, Moscow

[Abstract] Using literature sources and materials at the authors' institute, the authors counted cases of human leishmanioses in the USSR between 1919 and 1978. Epidemiologic evaluation of the data collected indicated that local cases were recorded in 8 union republics. There were 460 to 600 cases per year in 1950 through 1957, decreasing to 402 cases per year in 1958, 133 in 1963 and finally stabilizing to 50-to-70 cases after 1968, with some variation beyond this limit. At present, all cases of human leishmanioses are reported on an emergency basis (form 58) and are thoroughly investigated.
References: 56 (Russian).
[154-6508]

UDC: 616.98:578]-022.39-092.9:[576.895.771:591.67

EXPERIMENTAL INFESTATION OF MOSQUITOS AEDES CASPIUS CASPIUS PALL. ON VESPERTILIO PIPISTRELLUS BATS INFECTED WITH THE ISSYK-KUL' VIRUS WITH SUBSEQUENT TRANSMISSION TO SUSCEPTIBLE ANIMALS

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian
Vol 60, No 6, Nov-Dec 82 (manuscript received 17 Nov 81) pp 78-79

KOSTYUKOV, M. A., BULYCHEV, V. P. and LAPINA, T. F., Tadzhik Scientific Research Institute of Epidemiology and Hygiene, Dushanbe

[Abstract] This report presents experimental data on the possibility of transmitting the Issyk-Kul' virus to susceptible animals through the bite of the mosquito A. c. caspius infected from Vespertilio pipistrellus bats

carrying the virus. The bats were infected with Issyk-Kul' virus strain No. 620, 23rd passage by subcutaneous administration of 0.06 ml brain suspension with virus titer 5.5 log LD_{50}. On the fourth day after inoculation, two bats attached to plastic foam plates were exposed to humgry female mosquitos at 26 to 28°C for 3 to 4 hours during the period of maximum activity. The mosquitos were then allowed to bite 1 to 2 day old mouse pups which were then studied for the presence of the virus. The results of experiments indicate that the mosquitos can be vectors of the virus in its natural foci by passing the virus from bats to susceptible animals or man.
References: 2 (Russian).
[154-6508]

UDC 577.113

MOLECULAR CLONING OF ROUS SARCOMA VIRUS DNA FRAGMENTS

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 16, No 6, Nov-Dec 82 (manuscript received 30 Dec 81) pp 1183-1187

AMBARTSUMYAN, N. S., TATOSYAN, A. G. and YENIKOLOPOV, G. N., Institute of Molecular Biology, USSR Academy of Sciences, Moscow; Institute of Experimental Biology, Armenian SSR Academy of Sciences, Yerevan; All-Union Oncological Scientific Center, USSR Academy of Medical Sciences, Moscow

[Abstract] Conditions are described for cloning supercoiled proviral DNA derived from Rous sarcoma virus Praha C in plasmid pBR322, following fragmentation by HindIII restrictase and transformation of E. coli χ1776 cells. Two recombinant plasmids were obtained (pPrC11 and pPrC13) which, with the exception of a 150 nucleotide sequence, contained the entire viral genome. Subsequent cloning of pPrC11 in pBR322 yielded a subclone (psrcC) which incorporated the src gene sequence. The recombinant psrcC plasmid can be of potential use in studying the expression of the src gene in normal and transformed tissues in viral and nonviral carcinogenesis. Figures 3; references 17: 1 Russian, 16 Western.
[188-12172]

UDC 547.963.3

CLONING DNA FRAGMENTS OF BACTERIOPHAGE T5 IN PLASMID pBR322. ANALYSIS OF RECOMBINANT PLASMIDS BY E. COLI RNA POLYMERASE BINDING ON NITROCELLULOSE FILTERS

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 16, No 6, Nov-Dec 82 (manuscript received 30 Sep 81) pp 1253-1262

KRUTILINA, A. I., KSENZENKO, V. N., KAMYNINA, T. P., KRYUKOV, V. M. and BAYEV, A. A., Institute of Biochemistry and Physiology of Microorganisms, USSR Academy of Sciences, Pushchino, Moscow Oblast

[Abstract] Recombinant DNA technology was applied to bacteriophage T5 DNA which was cleaved by a variety of restrictases, and the segments were

subsequently spliced into plasmid pBR322. The recombinant plasmids contained ca. 17% of the T5 genome, largely fragments located at the boundary between the early and late phage genes with coordinates ranging from 68 to 77% of the length of the physical map of the phage. Restriction analysis of hybrid plasmids led to identification of a number of restrictase sites and localization of HindIII fragment Q. Analysis of E. coli MRE-600 RNA polymerase (EC 2.7.7.6) binding studies on nitrocellulose filters showed that the segments produced by PstI/HindIII are promoters which are presumably active in the infection of bacterial cells by T5. Figures 4; references 21: 3 Russian, 18 Western.
[188-12172]

UDC 577.1:547.963.3

COMPARATIVE MAPPING OF VIRION AND CLONED HEPATITIS B VIRUS DNA

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 16, No 6, Nov-Dec 82 (manuscript received 17 Mar 81) pp 1314-1321

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[Abstract] BamHI restrictase was used to split hepatis B virus (HBV) DNA for insertion into plasmid pBR322 and production of recombinant plasmids in transformed E. coli cells. Subsequent restrictase analysis of native HBV DNA and cloned DNA demonstrated virtually complete identity of the physical maps of both DNA species, and indicated the similarity of the DNA under study to that of HBV subtype ayw. Restrictase analysis of P-32 labeled viral DNA, following repair of the single-stranded DNA segments with endogenous DNA polymerase, led to its localization on the map and determination of its length at about 1500 nucleotides (ca. 50% of the HBV genome). Figures 3; references 36: 1 Russian, 35 Western.
[188-12172]

UDC 575.24:582.282

INDUCTION OF REPLICATING INSTABILITY IN FISSION YEASTS SCHIZOSACCHAROMYCES POMBE DUE TO VARIOUS MUTAGEN TYPES

Moscow GENETIKA in Russian Vol 18, No 3, Mar 83
(manuscript received 14 Apr 80; after completion 23 Dec 80) pp 409-412

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[Abstract] The goal of the present study was to find out whether there existed a correlation between the type of induced mutations and the effectiveness of induction of replicating instability (RI) by the mutagen used. The following mutagens were studied: N-nitroso-N-methylurea (NMU), a mutagen which induces primarily base pair substitutions, UV light--causing nonspecific mutations of both the base pair substitution and frame shift--and propylakhinyperite (PAY) which specifically induced frame shift mutations in yeasts. The study was performed on auxotrophic fission haploid yeasts Schizosaccharomyces pombe ade 7.407 h^- carrying a deletion in gene ade 7. The results obtained showed indeed a correlation between the ability of mutagens to cause base pair mutations and their ability to induce RI. The most effective inducer of RI was NMU, followed by UV (about half as effective as NMU) and PAY with almost no activity. The type of induced mutation had no effect on their distribution along the adenine locations. References 8: 2 Russian, 6 Western. [129-7813]

UDC 575.24:582.282.23

NEW METHOD FOR OBTAINING YEAST MUTANTS UTILIZING EXOGENOUS NUCLEOTIDES

Moscow GENETIKA in Russian Vol 18, No 3, Mar 82
(manuscript received 10 Nov 80) pp 377-380

KOROLEV, V. G., GRACHEVA, L. M., IVANOV, Ye. L. and TKACHENKO, V. P., Leningrad Institute of Nuclear Physics imeni B. P. Konstantinov, USSR Academy of Sciences

[Abstract] Yeast mutants were obtained from uracil and adenine auxotrophs capable of incorporating exogenous nucleotides. These mutants have been used to incorporate ^{125}desoxyuridinemonophosphate (IDUMP), methyl-^{3}H-thymidinomonophosphate (Me-^{3}HTMP), TM^{32}P and 5-^{3}H-desoxycytidinomonophosphate (5HDCMP) into DNA of yeast cells. This made it possible to get specifically labeled yeast DNA and to study genetic results of the decay of ^{125}I, ^{131}I, ^{3}H, ^{14}C and ^{32}P. The method was based on isolating rapidly-growing clones from mutant cells appearing on minimal media with adenosine or uridinemonophosphate. These mutants are capable of utilizing both oxy- and desoxynucleotides. It was shown that 30% of the 5HDCMP was incorporated in DNA (mostly in nuclear DNA), the rest being found in RNA and other cell

components. At the same time, more than 60% of Me-^{3}HTMP was found in DNA. Figure 1; references 10: 2 Russian, 8 Western.
[129-7813]

UDC 575.111:582.282.23

GENETIC EFFECTS OF TRITIUM DECAY INCORPORATED IN SACCHAROMYCES CEREVISIAE YEAST CELLS. PART 5: LETHAL AND MUTAGENIC EFFECTS AND NATURE OF MUTATIONS INDUCED BY TRITIUM DECAY AT SIXTH POSITION OF THYMINE

Moscow GENETIKA in Russian Vol 28, No 3, Mar 82
(manuscript received 15 Jan 81; after completion 2 Jul 81) pp 368-376

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[Abstract] Inactivation curves of haploid yeast cells and mutation induction in ade 1 and ade 2 genes have been reported in the study of the molecular nature of the mutation in gene ade 2 induced by tritium decay at the 6th position of thymine (6-^{3}H-T). Analysis of the inactivation curves due to 6-^{3}H-T and 5-^{3}H-T showed that the lethal efficiency was $\alpha_{6\text{-}^{3}\text{H-T}}=6.1\pm1.0\times10^{-3}$ decay^{-1} (or $7.6\pm1.3\times10^{-5}$ rad^{-1}) and $\alpha_{5\text{-}^{3}\text{H-T}}=8.8\pm3.0\times10^{-3}$ decay^{-1} (or $11.0\pm3.8\times10^{-5}$ rad^{-1}) respectively. Typical mutation induction curves in genes ade 1 and ade 2 were $K_{6\text{-}^{3}\text{H-T}}=2.8\pm1.7\times10^{-8}$ decay^{-1} (or $3.5\pm2.1\times10^{-10}$ rad^{-1}) and $K_{5\text{-}^{3}\text{H-T}}=4.6\pm1.6\times10^{-10}$ rad^{-1} (or $3.7\pm1.3\times10^{-8}$ decay^{-1}). It was shown that 6-^{3}H-T induces following mutations in the ade 2 gene: 6% frame shift mutations and 94% base pair substitutions of which 54% were transversions, 17% transitions of HC→AT and 23% transitions of AT→HC. Mutagenic specificity of 6-^{3}H-T is similar to that of 5-^{3}H-T. The damage to the thymine molecule either by an attack at the methyl group or by changing the conformation of the heterocycle does not represent lethal damage to the yeast except that the latter change leads to a weak mutagenic effect on the DNA specific for AT base pair substitution. Figures 3; references 19: 11 Russian, 8 Western.
[129-7813]

UDC 575.1:582.282

RAPID METHOD FOR DETECTION OF PLASMID DNA IN YEASTS

Moscow GENETIKA in Russian Vol 18, No 9, Sep 82
(manuscript received 28 Jul 81) pp 1429-1432

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[Abstract] Most of the strains of Saccharomyces cerevisiae contain 2 μm long circular DNA molecules, the so called 2 μm plasmids, with no apparent

functional meaning. In present study a number of yeast strains (Candida, Hansenula, Pichia Saccharomyces) was analyzed by the modified Birumboim method for presence of circular DNA molecules. Only Saccharomycetae yeasts contained plasmids identical with the 2 μm DNA plasmids by their electrophoretic mobility. No other strains possessed the 2 μm plasmids. This absence was confirmed by two other methods: ultracentrifugation of unpurified lysates in density gradient CsCl-EtBr and electrophoresis of lysates obtained in the system SDS-NaCl. References 10: 1 Russian, 9 Western.
[135-7813]

UDC 577.391:547.963.3

IN VITRO REPAIR OF GAMMA-IRRADIATED TRANSFORMING BACILLUS SUBTILIS DNA WITH EXTRACTS OF BLUE-GREEN ALGAE

Moscow GENETIKA in Russian Vol 18, No 4, Apr 82
(manuscript received 21 Nov 80; after final revision 12 Feb 81) pp 551-554

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[Abstract] Blue-green algae exhibit high resistance to ionizing radiation and a low level of spontaneous and induced mutagenesis, apparently due to their ability to remove γ-induced damage to DNA. An attempt was made to find out whether enzymes of blue-green algae could bring about post-radiation degradation and repair in vitro, using the transformation system of Bac. subtilis which appears to be a good model for it. Inactivation of the transforming activity (TA) of Bac. subtilis DNA drops significantly with an increase in radiation dose. Incubation of transforming DNA which was irradiated with 15 krad together with an extract of Anacystis nidulans leads to restoration of TA which depends on the irradiation dose, physiologic state of the algae culture, protein concentration andddduration of the incubation with the extract. Evidently, cells of blue-green algae possess effective enzymes for post-radiation repair. It is possible that this involved nicotinamidadenin-dinucleotide-(NAD)-dependent polynucleotide ligase which is activated with magnesium ions. Maximum effect of the restoration of TA is observed on incubation in presence of Mg^{++}, ATP and NAD. Absence of any one of these co-factors in the incubation mixture results in considerable drop of the repair. Figures 2; references 9: 4 Russian, 5 Western (2 by Russian authors).
[128-7813]

UDC 576.858.9

LYSOGENIC CONVERSION CAUSED BY PHAGE ϕ80. PART 1: PHENOMENON DESCRIPTION AND CLONING OF CONVERSION GENE

Moscow GENETIKA in Russian Vol 18, No 4, Apr 82
(manuscript received 2 Sep 80; after final revision 2 Mar 81) pp 555-560

KOZYREV, D. P., SVARCHEVSKIY, A. N., ZAYTSEV, Ye. N. and RYBCHIN, V. N., Leningrad Polytechnical Institute imeni M. I. Kalinin

[Abstract] There is only one short communication in the literature on the subject of lysogenic conversion caused by phage ϕ80, and even there no experimental data are reported. The following is reported on this conversion: 1) phage ϕ80 is not adsorbed on ϕ80 lysogens but 2) phage ϕ81 is; 3) the conversion manifests itself as TonB-phenotype; 4) the conversion determinant is in the range of early genes of phage ϕ80 and 5) conversion phenomenon has a dominant character. In the present paper experimental work was reported supporting findings 1) and 5) but contradicting points 2-4. No reason was given for the difference in findings. Localization of gene cor in central portion of the genome of phage ϕ80 was a surprising finding, because the authors expected the localization of it to be in the area of the phage ϕ80 immunity. In the second series of experiments, gene cor functioned in all 12 clones containing plasmids with the genes of 13 phage ϕ80. It indicated that gene cor has a specific promotor which is not controlled with protein repressor of phage ϕ80. Figures 2; references 16: 3 Russian (1 by Western author), 13 Western (1 by Russian author).
[128-7813]

UDC 575.1

TRANSFER OF R-PLASMIDS (pRDI AND RP4) INTO AZOSPIRILLUM BRASILENSE STRAINS AND THEIR EFFECT ON NITROGENASE ACTIVITY OF CELLS

Moscow GENETIKA in Russian Vol 18, No 4, Apr 82
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[Abstract] Experimental data were reported on the ability of A. brasilense strains to accept R-plasmids of the Pl-group of incompatibility (pRD1 and RP4) possessing broad transmissive properties. RP4 plasmid contains genes determining resistance to kanamycin, carbenylcylline and tetracycline; pRD1 is a hybrid nitrogen-fixing plasmid based on RP4 and containing his-nif segment of the chromosome K. pneumoniae. In experiments on conjugative transfer of plasmids pRD1 and RP4 from E. coli cells to cells of A. brasilense, maximum efficiency was obtained when the donor and recipient cells were grown before

the logarithmic growth phase. These plasmids were transferred at a high rate to 94-3 strain cells and somewhat slower into Sp7 cells. The plasmids were stable in A. brasilense cells expressing genes of medical resistance and could be transferred to other azaspiryl cells. Transfer of plasmid-containing genes of nitrogen-fixing K. pneumoniae into the azaspiryl cells could increase their nitrogenase activity due to an increase of nif-gege. This was checked out on 28 strains of transconjugates of 94-3 and Sp7, checking their ability to reduce acetylene (test for nitrogenase activity); 68% showed higher activity in strain 94.3 and 54% in the Sp7. Figure 1; references 20: 3 Russian,(2 by Western authors), 17 Western.
[128-7813]

UDC 57511

ANALYSIS AND PROPERTIES OF BACTERIAL CLONE CONTAINING GENE FRAGMENT OF L-CHAIN IMMUNOGLOBULIN

Moscow GENETIKA in Russian Vol 18, No 6, Jun 82
(manuscript received 6 Apr 81; after final revision 19 Nov 81) pp 888-895

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[Abstract] Analytical data are reported along with properties of a clone containing a fragment of structural gene of the L-chain immunoglobulin G of myeloma MOPC 21. DNA of hybrid plasmids, purified electrophoretically to homogeneity, was analyzed with a number of restrictases. On the basis of comparison of analytical data with original structure of mRNA of the L-chain immunoglobulin three plasmids were screened out: p5-5, p8-1 and p13-2, from which p8-1 was chosen for further studies, since it was shown to contain inserted segment of greatest length, and it was the only one with a deletion. Using restriction endonucleases Sau961, Sau3A, MspI and BspI, it was shown that the deletion starts at 376th nucleotide and ends at the 618th position of the plasmid pBR322. Further analysis identified right and left termini of the inserted fragment and its orientation in plasmid p8-1. The DNA fragment is the 3'-segment of the L-chain gene (from 3'-terminus to 328th nucleotide) which corresponds to the entire 3'-nontranslating and a portion of the constant region of the L-chain immunoglobulin of the x-type. Figures 4; references 17: 3 Russian, 14 Western.
[199-7813]

UDC: 615.849.19

COURSE ON USE OF LASER RADIATION IN PUBLIC HEALTH CARE

Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian No 11, Nov 82 (signed to press 25 Oct 82) p 75

[Article by I. Z. Nemtsov, candidate of physicomathematical sciences (Moscow)]

[Text] In late April, the Central Committee of the Komsomol offered a course in Narva (Estonian SSR) for young scientists and specialists on "Laser Equipment and Technology," under the scientific guidance of Academician Ye. P. Velikhov, vice-president of the USSR Academy of Sciences, and Academician G. A. Nikolayev, head of MVTU [Moscow Higher Technical School] imeni N. E. Bauman, Hero of Socialist Labor. More than 200 people from different cities of the Soviet Union participated in this course. There were both plenary and sectional sessions. There were sections on laser equipment [or techniques], laser technology and laser medicine. The last mentioned was headed by A. K. Polonskiy, doctor of medical sciences, chairman of the problem commission of the scientific and technological council of the USSR Academy of Medical Sciences for use of lasers in medicine and biology. Representatives of virtually all major centers concerned with the study of this problem were among the participants in this section: All-Union Scientific Research Institute of Eye Diseases, USSR Ministry of Health, Saratov Medical Institute, Moscow Stomatological Institute, Moscow Scientific Research Institute of Emergency Care imeni N. V. Sklifosovskiy and others. Major scientists participated in meetings of the medical session: Prof O. M. Pozdnyakov, doctor of medical sciences, Prof Yu. P. Rayzer, doctor of physicomathematical sciences.

The delivered papers contained extensive factual material about the results of introducing modern methods of treatment with use of laser equipment. It was critically analyzed from all points of view, which was of definite benefit to both the speakers and all those present. There was a frank discussion of difficulties that arise with introduction of new methods of treatment using lasers. In the course of the discussions, it was learned, on the example of the laser laboratories at the All-Union Scientific Research Institute of Eye Diseases, USSR Ministry of Health, Central Scientific Research Laboratory of the Fourth Main Adminstration under the USSR Ministry of Health and others, that organization thereof yields a great scientific and economic effect, and holds the promise of even greater benefits to medical institutions in the future.

When used correctly and wisely, lasers lead to a clearly marked therapeutic response in the most varied areas of medicine. As reported in the medical

section, the efficacy of "laser" therapy has now gained the recognition of ophthalmologists, surgeons, "combustiologists" [burn disease specialists?], traumatologists, physiotherapists and stomatologists. The use of low-energy lasers is particularly promising. Even now, methods are being developed for use of such lasers in treatment of various types of dermatosis, wounds and fractures, gynecological, urological and proctological diseases, pneumonia, angina pectoris and ischemic heart disease, various diseases of the nervous system, etc. However, unqualified and uncontrolled use of lasers by physicians, which has occurred, unfortunately, in a number of cases, could lead to undesirable results, particularly since the biological effects of laser radiation are still not clear enough. For this reason, a cautious and unified approach is needed for laser therapy of different diseases.

The audience of this course--scientists and engineers specializing in laser technology--displayed much interest in the hygienic aspects of using high-power technological lasers in industry. Special papers on this subject were delivered by A. K. Polonskiy, head of the laboratory of medical laser research, and Docent V. A. Kashuba at plenary sessions of this course. V. S. Aleynikov, candidate of engineering sciences and laboratory head, reported on development and series production of medical laser units. All of those present commented on the exceptional fruitfulness of the work of the sections. It should be noted that the medical section was given much attention by the organizers of the course, Academician G. A. Nikolayev and Prof A. G. Grigor'yants. Organization of this course was an important event in the development of laser technology and medicine in our country.

10,657
CSO: 1840/119

UDC: 617.7-085.849.19:615.272.7

PROSPECTS OF USING STIMULATING LASER THERAPY IN OPHTHALMOLOGY

Odessa OFTAL'MOLOGICHESKIY ZHURNAL in Russian No 4, 1982 (manuscript received 18 Feb 82) pp 193-197

[Article by L. A. Linnik, doctor of medical sciences, N. I. Usov, candidate of medical sciences, P. P. Chechin, junior scientific associate, and O. S. Pelepchuk, physician, Odessa Scientific Research Institute of Eye Diseases and Tissue Therapy imeni Academician V. P. Filatov]

[Text] The clinical use of lasers in ophthalmology has a relatively short history, numbering about two decades. The first research is referable to the mid 1960's. These studies determined the possibility of using lasers in ophthalmology, refined the specifications for their design and defined the main parameters of radiation. As a result of extensive research and designing work by ophthalmologists in collaboration with competent technical enterprises, domestic laser instruments were developed for use in ophthalmology, and indications were elaborated for use of laser radiation in the treatment of a number of eye diseases, and this provided the conditions for clinical use of lasers (L. A. Linnik, 1966; A. F. Migacheva, 1969; M. V. Zaykova et al., 1972).

Coagulation of tissue by the light flux is the main principle in using laser radiation in ophthalmology (N. A. Puchkovskaya, L. A. Linnik, 1965; L. A. Linnik, 1966; M. M. Krasnov, 1972; Ye. S. Libman, 1974). At the present time, on the basis of this principle, the following procedures are being performed with success: treatment of laceration and separation of the retina; destruction of some forms of intraocular tumors, excision of synechia; lasers are also used in the treatment of diabetic angiopathy and glaucoma (L. A. Linnik, L. A. Vedmedenko, I. M. Logay, 1973; L. A. Linnik, I. N. Ganichenko, 1974, 1975; L. S. Terent'yeva, 1976, 1977; R. A. Kerimov, 1978; T. I. Yeroshevskiy, V. M. Petukhov, 1979; Hager, 1974; Abraham, 1976).

Since about the mid 1970's, a basically new direction began to take shape in ophthalmology in use of laser radiation. We refer to the use of low energies, which do not elicit visible destruction in exposed tissues. Interest in such energy levels emerged as a result of clinical observations.

In treating central separation of the retina by the method of laser coagulation, it was quite understandable that there was a desire to produce reliable adhesion with minimal size of coagulation site and use of minimal energies. In a number of instances, there was increase in visual acuity after such treatment, whereas

no visible changes actually developed in the fundus. The information existing at that time on effects of lasers on biological objects was indicative of possible stimulation. Thus, it was demonstrated in several works that laser radiation increases proliferative activity of cells in culture (M. T. Aleksandrov et al., 1976; Crawford et al., 1969), stimulates cell reproduction and intensifies DNA synthesis (G. K. Moskalik et al., 1977, 1979), increases phagocytic activity of lymphocytes (Mester et al., 1968), accelerates healing of skin wounds (Mester et al., 1969) and increases mitotic activity of neoplastic cells (S. D. Pletnev, 1981).

We investigated the effect of low-energy laser radiation on lymphocyte cultures (N. S. Shul'gina, P. P. Chechin, A. P. Privalov, 1981). When lymphoid cells were cultivated in the presence of PHA (phytohemagglutinin), i.e., a nonspecific mitogen, a certain percentage of these cells underwent mitosis. The ratio of blast forms of cells to the quantity of degenerated cells was indicative of the stimulating effect of the nonspecific mitogen. It was established that use of energy of up to 0.4 mW/cm^2 elicits the most active blast transformation of lymphocytes (45%) with minimal amount of degenerative cells--5.9%. Using the reaction of blast transformation to PHA as a control, we were able to determine the intensity of effect of laser radiation on proliferative processes in a lymphocyte culture.

These and analogous observations suggest that, with treatment of the retina also, the improvement of visual acuity could be related to a stimulating effect. However, it should be noted that, in the cited examples, we are dealing with increase in proliferative activity of cells, whereas such activity is not inherent in nerve elements of the retina and, consequently, judgment about a stimulating effect in that case was purely speculative. It was necessary to make sure that changes occur in retinal cells after exposure to low-energy lasers, which could be indicative of an increase in their activity.

Studies pursued in this direction made it possible not only to confirm the objectively observed changes in retinal cells, but demonstrate several typical distinctions in this reaction. For example, it was established that when animal's eyes were exposed to laser radiation focused on the fundus, which elicited on histological preparations foci of coagulation, which were small but readily demonstrable, electron microscopy of the perifocal zone, in areas at some distance from the focus, was indicative of excitation of biosynthetic processes in neuroepithelial cells (N. Ye. Dumbrova et al., 1978).

Cytochemical and radioautographic studies revealed that, with analogous treatment of the eye, as well as with use of 20-30% less energy ("subliminal" energy), there was activation of extramitotic DNA synthesis in ganglionic and bipolar cells of the retina. The first signs of increased DNA synthesis were already noted a few hours after irradiation; by the end of the day [24 h period], DNA synthesis reached a maximum level, declining on subsequent days and reaching the initial level by the end of a week. DNA content in cell nuclei increased by 25-30% in this time, and it remained high (N. I. Usov, L. A. Linnik, 1978). The reaction of retinal cells to laser radiation is not limited to activation of DNA synthesis; there was concurrent intensification of RNA synthesis. This reaction reached a maximum 24-48 h after exposure (N. I. Usov et al., 1981).

In the experiments we have described, we were impressed by one feature they had in common: both electron microscopic and cytochemical changes in cells were demonstrable at a rather great (4-6 mm) distance from the focal spot, i.e., the reaction of retinal cells to radiation was manifested over a large area, the retina reacted like a single functional structure.

This distinction of retinal reaction to local irradiation served as the basis for development and subsequent clinical use of a new method of treating some forms of dystrophy of the macula lutea (N. I. Usov et al., 1978, 1979, 1981; T. I. Yeroshevskiy et al., 1981; L. L. Ustimenko et al., 1981).

It should be noted that use of the stimulating effect of lasers is limited for the time being only to dystrophic lesions in the region of the macula retinae, which is apparently not the only capability of this form of therapy, just as the improved visual acuity does not exhaust the clinical manifestations of stimulating effect of laser radiation on eye tissues. In studies of recent years, dealing with changes in retinal cells under the effect of laser radiation, there were concurrent investigations of reactions of other eye tissues to this factor. It was established that when a laser beam is focused on tissues of the fundus there are signs of increase in functional activity of the anterior corneal epithelium and epithelium of the anterior lenticular capsule. The nature of changes observed in these cells was not the same, depending on what activity was inherent in them under normal conditions. Thus, the epithelial cells of the central zone of the anterior lenticular capsule, which normally do not manifest any noticeable proliferative activity, reacted like the ganglionic cells of the retina, with increase in extramitotic DNA synthesis under the effect on the eye of subliminal energy levels, and it was only when the eye was exposed to higher energy pulses, when gross sites of coagulation formed on the fundus, that one observed stimulation of proliferative activity of epithelial cells of the central lenticular capsule (N. I. Usov et al., 1978). If we consider that extramitotic DNA synthesis is a normal manifestation of vital functions of nondividing cells and that it is usually observed at a young age, and in response to an exogenous factor at an older age (N. I. Usov, 1977, 1978, 1980), we should mention two important factors, in our opinion, in the reaction of eye tissues to laser radiation; in the first place, there is activation of processes that are normally inherent in eye tissues as a result of irradiation and, in the second place, the response of eye tissues is generalized, with involvement of structures that are rather far from the site of exposure. The fact that stimulating laser therapy is not associated with any manifestations that are unusual for eye tissues could be indicative of its safety, while generalization of the stimulating effect provides the grounds for research on expanding indications for this form of therapy.

On the basis of the existing sparse reports (V. D. Starodubov, 1978; A. D. Semenov et al., 1979; S. H. Fedorov et al., 1979), we decided to investigate the possibility and determine the desirability of clinical use of low-intensity laser radiation for some pathological states of the cornea.

A standard defect was produced in the anterior epithelium of both eyes of rabbits, one of which was a control. The entire cornea was exposed to a defocused helium-neon laser beam with intensity of 0.05 to 4.0 mW/cm^2, with exposure of 1 to 3 min. In the first series of experiments we monitored the

course of regeneration. In the second and third series, we studied the quantitative and qualitative changes in DNA synthesis.

Clinical observations revealed that laser radiation and energy density of up to 0.1 mW/cm^2 had a stimulating effect on regenerative processes in the cornea, manifested by faster epithelization than in the control. Using autoradiography and cytophotometry, it was possible to establish that stimulation of regenerative processes is due to intensification of proliferative activity of anterior epithelial cells.

Experimental studies made it possible to transfer the method to clinical practice. In clinical practice, helium-neon and argon continuous-wave lasers were used. The intensity of radiation constituted 0.05-0.1 mW/cm^2 for helium-neon lasers and 120 mW for argon, the diameter of the light spot ranging from 2 to 20 mm, depending on the size of the lesion. After passing through a short-focus lens and wavebeam [light] guide, the laser beam hits the mirror of a slit lamp. Irradiation of the entire surface of the cornea, with inclusion of the marginal ansate network [rete?] and, if necessary, the sectorial network, was effected with a defocused beam. In addition, an argon laser was passed over the cornea in "shuttling" [weaving] movements, starting at the limbus and going to the center.

Laser stimulation of the cornea was performed on 71 eyes in 63 patients. Of them, 46 (54 eyes) had burns varying in severity and 17 presented epithelial-endothelial dystrophies. Absence of response to prior use of intensive drug therapy to accelerate regeneration served as grounds for using laser stimulation. Persistent and stationary erosion lasted 8.5 days in cases of moderately severe burns, 17.5 days with severe ones and 23 days with particularly severe ones.

After 2-3 treatments, blepharospasm disappeared, lacrimation diminished and there was attenuation of the inflammatory reaction. After 5-8 treatments, the ischemic sections of the conjunctiva turned pink and were soon similar in appearance to their normal state. Complete epithelization was noted after 3-5 treatments in the case of moderate burns and 8-10 with severe burns. Laser therapy led to a calmer course of the burn process, rapid covering of the cornea with epithelium, which ultimately had a beneficial effect on the outcome of the burn process. Laser therapy was found to be more effective at the early stages of epithelial-endothelial dystrophy, and the therapeutic response was less marked if it had been present for over 2 years. There was reduction of edema of the epithelium and stroma of the cornea, attenuation of pain and disappearance of pericorneal injection, as well as partial restoration of sensibility. Improved trophic conditions led to improvement of visual functions. It should be noted that, in the presence of pathology of the cornea, the combined use of helium-neon and argon lasers was more effective. No complications have been noted with use of stimulating laser therapy. This warrants the belief that it is expedient to use this method for treatment of corneal burns and dystrophy.

The next stage in the study of effects of low-power laser radiation was to investigate the manifestation of the stimulating effect in the case of pathology of the lens. Normal occurrence of metabolic processes in the lens depends largely on the state of its epithelial cells. When the lens is clear, trophic function of the epithelium is quite sufficient and stimulation cannot contribute

any visible changes in the condition of the lens. It could have been expected that the stimulating effect would be manifested clinically when the trophic function of the epithelium is inadequate, for example, when a cataractogenic factor is involved.

Experiments were conducted on rabbits who were treated daily with naphthalene in a dosage of 1.5 g/kg weight, i.e., one of the models of toxic cataract was produced.

No additional factors were used in the control group (36 animals), whereas the experimental group (26 animals) was submitted to radiation from argon lasers 1 day prior to naphthalene in doses that did not cause foci of coagulation on the fundus. They were exposed to lasers delivered in the form of 3-5 pulses lasting 0.01 s at 1-s intervals.

In the control group, a spindle-shaped opacity developed in the subcapsular layer in the region of the lenticular equator on the 2d-3d day in some animals and by the end of the first week after the start of naphthalene intake in most. The opacities were situated radially under the anterior and posterior capsules. Continued administration of naphthalene to the animals led to widening of opacities, merging and within a few days the entire substance of the lens became opaque. Average time for start of cataract development constituted 5.0±0.5 days in the control group.

In the group of rabbits who were exposed to argon lasers before administration of naphthalene, it was virtually impossible to produce a cataract. Only 1 of the 26 animals developed an incipient cataract in one eye on the 22d day of naphthalene intake. Administration of naphthalene was continued in the rest of the animals until they died of poisoning; nevertheless they did not develop cataracts.

In the control group, continued administration of naphthalene after appearance of cataract also led to animal death due to systemic poisoning, which developed at about the same time as in the experimental group, i.e., exposure of the eyes to argon lasers had no effect on survival time.

The noteworthy distinction in the effect of laser radiation in this case was that there was not simple stimulation of functional activity, but enhancement of lenticular resistance to a cataractogenic factor. With respect to many diseases, including cataracts, we can discuss the existence of differing degrees of individual sensitivity or individual resistance. This was distinctly manifested in the control group of animals: some rabbits developed a cataract on the 2d day, most by the end of 1 week, while 1 only on the 14th day. Thus, laser irradiation of the eyes led to substantial decrease in sensitivity of the lens to the cataractogenic factor, longer persistence of transparency under conditions known to be adverse.

In conclusion, it can be stated that the possibilities of using low-energy laser radiation in the treatment of eye diseases are still far from having been exhausted. The serious grounds for such a conclusion are referable to the distinctions of the response of eye tissues to this factor, which we have discussed above: generalized reactions and absence of qualitative differences

from manifestations of normal vital function of cells and tissues. The latter circumstance, as well as the extensive experience in clinical use of this form of therapy, also enable us to answer a question of such practical importance as the question of safety. Indeed,we know of methods of "stimulating" physiological functions with certain pharmacological agents. As a rule, such stimulation is based on mobilizing the cell reserves and, with prolonged use or use against the background of a heightened load, it can lead to depletion of cellular reserves and development of destructive processes.

In the case of stimulating laser therapy, apparently it is not so much a direct intensification of functions as an increase in functional capacities of cells, increase in their viability that occurs, which enables us to consider this form of therapy as being quite safe and investigations to expand indications for its use as being promising.

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SO-CALLED LASER STIMULATION OF MACULA LUTEA, AND POSSIBLE THEORETICAL INTERPRETATION OF MECHANISM OF ITS EFFECT

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[Article by Prof M. M. Krasnov, academician of the USSR Academy of Medical Sciences, A. V. Bol'shunov, G. G. Ziangirova and N. N. Pivovarov, candidates of medical sciences, All-Union Scientific Research Institute of Eye Diseases, USSR Ministry of Health]

In recent years, several reports have appeared in the Soviet literature (we were unable to find any analogous works in the foreign press) about the successful use of lasers for photostimulation of the macula in the presence of dysbinocular amblyopia and maculodystrophy (L. A. Linnik et al., 1971, 1977, 1978, 1979, 1981; E. S. Avetisov et al., 1975; A. D. Semenov et al., 1979; S. N. Fedorov et al., 1979, 1981; T. I. Yeroshevskiy et al., 1981). The positive therapeutic response consisted mainly of more or less stable improvement of visual acuity. Various laser sources (argon, helium-neon, ruby, neodymium), methods and modes of delivery were used for laser stimulation treatment. Efforts have also been made to explain the mechanism of the stimulating effect of laser radiation (N. Ye. Dumbrova et al., 1979; N. I. Usov et al., 1981; S. N. Fedorov et al., 1981).

We report here on a study of the therapeutic efficacy of so-called laser stimulation (LS) of the macula using our own method, as well as possible theoretical interpretation of the mechanism of its action.

It is known that the following are the most important requirements of any new form of therapy: a) safety, b) physiological validation, c) high therapeutic efficacy. For this reason, in selecting the source for LS, parameters and modes of operation, as well as delivery methods, we took the following into consideration: 1) possibility of phototoxic effect of lasers on the retina of the irradiated eye (M. V. Zuyeva, 1979; Berson, 1973); 2) high photosensitivity of the eye to sinusoidal modulated light at a frequency of 10 gTs [typo for Hz?], which is close to the alpha rhythm of the cerebral cortex (De Lange, 1958); 3) possibility of anatomically intact but functionally inert sections of the retina in the macular or paramacular region in patients with macular dystrophy.

Material and Methods

We used a working model of a unit that we designed (Ye. I. Yegorov, A. V. Bol'shunov, N. N. Pivovarov, L. A. Malakhova et al., 1981*) based on an OKG-13 helium-neon laser for laser stimulation of the macular region. After preliminary drug-induced midriasis (for example, with 0.25% homatropine solution), the patient's head was placed in a facial support. During the entire treatment the patient was asked to fix his gaze on an unfocused, parallel (angle of divergence on the level of 0.5) laser beam 2 mm in diameter in the field of vision of the treated eye. At the same time, we made sure that the laser beam was always in the center of the pupil. We exposed the involved eye to lasers for 2-3 min in a pulsed mode at a pulse recurrence frequency of 10 gTs at constant power of 0.25 mW. If there was no positive response, the treatment was repeated after 7-10 days. When no response was observed even after the second LS, the treatment was discontinued entirely. In some cases, LS was administered every 2-3 months.

In all, we submitted 52 eyes of 45 patients with senile (34 eyes, 31 patients) and myopic (18 eyes, 14 patients) macular dystrophy to LS. Low (0.1 or less) visual acuity and absence of response to drug therapy served as indications for LS. Campimetry, macular tests (9 points, Amsler's grid), modulated CFFF [critical flicker fusion frequency] with red color and bioophthalmoscopy were performed on all patients before LS, immediately after it and at intervals.

Results

Already on the 2d day after an LS session, most patients (39 people, 44 eyes) observed subjective improvement. Objectively, we observed varying degrees of improved visual acuity, by an average of 0.26±0.03 (Figure 1), improvement of macular tests, increased modulated CFFF by 5-6 hTs in 35 patients (39 eyes). Four patients (5 eyes) reported subjective improvement of vision without objective confirmation. In 2 cases (2 eyes) we observed subjective and objective decline of vision. In 8 cases (11 eyes) the treatment had no effect. Of the 39 patients who had a positive subjective effect, 22 requested that the treatment be repeated after 2-3 months because of diminished v'sion. Objectively, 18 of them presented more or less marked decline of visual functions. Virtually all (17 patients) reported a positive effect after repeated LS.

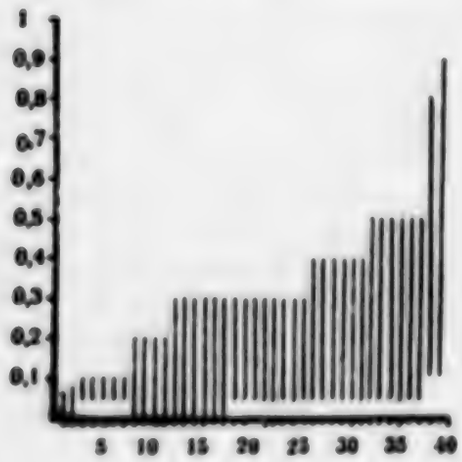

Figure 1.
Increase in visual acuity of patients with macular dystrophy after LS treatment. X-axis, number of eyes; y-axis, visual acuity

Discussion

Although so-called "laser stimulation" of the macula lutea has some, be it minor, experimental validation (Ansell, Marshall, 1976), we found virtually no attempts at theoretical validation of this procedure in the literature published to date on

*Rationalization proposal No 174/82 dated 28 December 1981.

this subject. Indeed, it is not so easy to imagine why and how a laser beam, which has a coagulant effect, activates the function of receptor elements. In this regard (M. M. Krasnov), a possible theoretical explanation is offered, the main element of which is the assumption that the retinal pigment epithelium is the principal point of application of the effect of laser beams.

According to current conceptions, the pigment epithelium performs at least five main functions:

1. Absorption of photic energy that excites photoreceptors.

2. Transfer of nutrients from the vascular tunic to external layers of the retina.

3. Deposition of vitamin A and conversion thereof into a form that can be assimilated by photoreceptors to synthesize rhodopsin.

4. Production of mucoprotein, which, so to speak, encapsulates the photoreceptors and separates them from one another.

5. Phagocytosis and lysis of residues of disks that make up the actual light-receiving part of the receptor and that are dissociated ("explode") under the effect of light, furnishing energy for nervous excitation (Davson, 1980).

In the hypothesis that we are expounding, a central place is given to expressly the last of the listed functions.

As we know, normal pigment epithelium retains its typical structure (and, apparently, functions) up to the age of about 30 years. After this, senescent changes begin in it, which are quite typical (lipofuchsin granules, accumulation of lipids and, particularly, accumulation of residues of cells and other extraneous material that was previously removed entirely mainly by means of phagocytosis). These changes progress consistently with age. In the presence of senile macular dystrophy, there is usually a drastic increase in amount of such residues and lipid particles that "obstruct" the retina. Several studies have demonstrated (Klien, Krill, 1967; Apple, Maurice, 1974) that in the presence of age-related dystorophy the blood supply to the macular region is often unimpaired or insignificantly impaired; thus, this cannot be considered the prime factor of pathology. However, the above-mentioned "obstruction" of the region of the pigment epithelium with extraneous particles and fibrils can take place, in spite of satisfactory blood supply. Accumulation of such masses could reach such an extent that they start to seemingly eject cells of the pigment epithelium, which are also, in turn, subject to dystrophy. These findings served as the basis for a theory (Hogan, 1974), according to which the most important pathogenetic factor in macular dystrophy is impairment of phagocytosis, by means of which the retina is normally "cleansed" of the "obstruction" by residual material, primarily remnants of "exploded " photoreceptor disks. On this basis, it was suggested that agents stimulating phagocytosis (diphenyl hydantoin and others) be used to treat macular dystrophy. As shown by clinical practice, they elicit a positive response provided, of course, that the dystrophic process is not too advanced, i.e , at the stage of irreversible atrophy.

It is known that laser radiation can apparently stimulate phagocytosis, and even this was already a beneficial therapeutic factor in the mechanism of effects of

so-called "laser stimulation" of the macula. At the same time, it would be logical to make an even simpler assumption about the direct effect of laser radiation on the material that "obstructs" the retina in the region of the pigment epithelium. Within the limits of such a theory, the laser beam becomes a "helper" of the normal physiological system that removes extraneous elements from the retina. From this vantage point, data become understandable, for example, to the effect that a red laser beam is better than a green one (L. A. Linnik et al., 1981), since it is not retained by blood circulating in the internal layers of the retina and, consequently, better reaches the layer of pigment epithelium.

Of course, this hypothesis requires confirmation, primarily experimental. At the present time we are conducting such studies in order to confirm (or reject) the working hypothesis we have advanced.

Thus, in a study of the retina of a neoplastic eye irradiated prior to enucleation by the method described above (visual acuity 0.04 before treatment without correction versus 0.3 with corr. sph. 1.5 diopter on 2d day after LS), in addition to changes related to neoplastic growth we observed cystic degeneration of the retina in the layer of fibers, dilatation of intercellular spaces in the granular layer and destruction of isolated ganglion cells (Figure 2 [photo not reproduced]) in the region exposed to lasers. In the neuroepithelial layer, there was hypertrophy of cone segments. Proliferation was observed in the layer of pigmented epithelium. This could be related to reactive changes in response to neoplastic growth and, perhaps, laser radiation.

Conclusions

1. Laser stimulation of the macula lutea in the presence of macular dystrophy with pulsed (10 Hz frequency) unfocused helium-neon lasers is safe, physiologically validated, effective and technically simple.

2. The probable mechanism of therapeutic effect of laser stimulation of the macula in the presence of macular dystrophy is related to intensification of phagocytic activity of the retinal pigmented epithelium and, perhaps, direct effect of laser radiation on the products of dissociation of neuroreceptors.

PHOTO CAPTION

2. p 200. Changes in retina of neoplastic eye in response to laser (helium-neon laser) radiation. Magnification 2000× (hematoxylin-eosin stain)
   a, б) cystic changes in fibrous layer
   в) destruction of isolated ganglionic cells
   г) hypertrophy of internal cone segments

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STIMULATING EFFECT OF HELIUM-NEON LASERS ON ACUTE INFLAMMATORY PROCESSES IN THE EYE

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[Article by Prof G. S. Semenova, I. I. Vorob'yeva, graduate student, V. P. Semenov and T. P. Donarskaya, physicians, Lvov Medical Institute]

[Text] the mechanism of effect of lasers is based on absorption of luminous energy by atoms and molecules of compounds, with transformation into thermal, acoustic and mechanical energy of photochemical processes (S. D. Pletnev, 1981). This influences biophysical and biochemical processes in tissues, and has a positive effect on functional state of the nervous, vascular and skeletomuscular systems of man (V. M. Inyushin, T. F. Inyushina, M. I. Mazo, 1967; B. M. Khromov, 1973; V. N. Koshelev, 1980).

The interest in use in medicine of gas (helium-neon, argon) lasers, which are characterized by monochromatic and coherent radiation, is related to the absence of a marked thermal effect and presence of distinct stimulating effect on biological objects (M. Ye. Zel'tser et al., 1967; V. P. Zhokhov, R. I. Kovach, 1969; Kh. I. Voronina, 1970; U. Ya. Bogdanovich et al., 1971; O. G. Astaf'yeva et al., 1980).

L. A. Linnik et al. (1971, 1978) and M. M. Krasnov et al. (1973, 1976) have noted the prospects of using lasers in ophthalmological practice.

Subliminal doses of laser therapy, which do not elicit a coagulant effect, have found good application in clinical ophthalmology for central dystrophy of the retina (E. G. Yeliseyeva, 1979; A. A. Bochkareva et al., 1981; L. L. Ustimenko et al., 1981), dystrophy of the cornea (A. D. Semenov et al., 1977), dysbinocular amblyopia (S. N. Fedorov et al., 1979) and resistant forms of ocular herpes (Yu. F. Maychuk et al., 1977). The beneficial effect of lasers is long-lasting, and it is attributable to improved DNA synthesis in retinal cells, which could serve as the basis of the stimulating effect of subliminal doses of laser therapy (N. I. Usov, L. A. Linnik, 1978).

Use of helium-neon laser energy in clinical ophthalmology is limited to isolated reports pertaining to chronic diseases of the eye (A. D. Semenov et al., 1977; L. A. Linnik et al., 1978; V. D. Starodubov, 1978; S. N. Fedorov et al., 1979). Studies were made of the effect of diffuse helium-neon lasers of 20 mW. Use of

low-power 2 mW helium-neon lasers for acute inflammatory diseases of the eye is not covered in the literature available to us. For this reason, we used an updated helium-neon type LG-78 laser with 2 mW power, of domestic manufacture, which permits both diffuse and focused treatment of tissue.

We had 249 patients under observation, on whom we used laser stimulation in the course of combined therapy, in order to improve the optical and cosmetic results; 90 of them had keratitis (viral etiology in 41 cases, allergic in 26, infectious in 19, undetermined etiology in 4), 83 presented acute infectious iridocyclitis (tonsilogenic in 21 cases, odontogenic in 17, viral in 15, sinusogenic in 14, mixed in 10 and undetermined in 6) and 76 with traumatogenic iridocyclitis. The patients ranged in age from 16 to 72 years. There were 113 men and 136 women. (The control consisted of 250 patients with the same diseases). There was concomitant lesion of the posterior segment of the eye, for which reason we observed narrowing of the visual field in some meridians by 15-30° in 46 patients with eye injury.

Before and after laser stimulation, we tested on all patients visual acuity, visual field, dark adaptation color perception, sensitivity of the cornea, ophthalmotonus, hydrodynamics of the eye, and we performed campimetry, ophthalmoscopy and biomicroscopy. Long-term results were assessed at 1 month to 4 years in all patients submitted to laser stimulation. Before treating the eye, photophobia and blepharospasm were reduced by delivering the beam to the region of the supraorbital and infraorbital points of exit of branches of the trigeminal nerve and center of the physiological fold of the upper eyelid with the rima closed for 30-60 s. As a rule, the beam had an anesthetic and analgesic effect, and we then gave the laser treatment to the region of erosion or corneal infiltrate, focus of inflammation in the region of a fresh cicatrix or projection of the ciliary body on the sclera in the cases of iridocyclitis. We selected individual doses for each patient, depending on pigmentation of the iris, fundus, skin and with consideration of refraction. Output power was 2 mW, wavelength 6328 Å, diameter of light spot 50 μm and exposure time averaged 10-15 s for each point. The patients received 7-10 treatments in the case of primary visit for an acute process and 10-20 treatments when a patient returned to eliminate residual signs of the process. We gave 1-3 treatments per day for laser stimulation, at 3-h intervals between them. One treatment of laser therapy consisted of 3 to 7 applications to the area of inflammation. Duration of treatment averaged 7-15 days (17-29 days in the control).

In order to prevent a cumulative effect of laser stimulation on optical media of the eye and retina, the beam was focused in all cases of corneal pathology on the site of lesion tangentially, sliding along its surface in the surrounding space. In the presence of diseases of the vascular tunic, the beam was focused on the sclera in the projection of the ciliary body at 12, 3, 6 and 9 o'clock for diffuse iridocyclitis and in the region of circumscribed lesion in the presence of granulomatous iridocyclitis. In the presence of hypertensive inflammatory processes, we additionally stimulated the points of exit of the occipital nerve and trophic point of the eye on the earlobe for 30-60 s. Initial visual acuity of the patients was in the range of 0.001-0.7. The dynamics of visual acuity before and after treatment are shown in Table 1.

After laser stimulation in conjunction with other forms of treatment of inflammatory processes in the eye, visual acuity improved in 242 cases (96.9% out of 249,

versus 88.4% in the control). Visual acuity of up to 0.04 remained after treatment in 1 out of 9 patients; it was in the range of 0.05-0.1 in 5 out of 119 cases, in the range of 0.2-0.3 in 11 out of 92, and it increased significantly, from 0.4 to 1.5 in 232 patients (93.1% of all those receiving laser stimulation).

Table 1. Visual acuity before and after laser stimulation with helium-neon laser in cases of inflammatory processes in the eye of diverse origin

Process	Visual acuity before treatment	Number of eyes	Visual acuity after treatment						
			0,001—0,01	0,05—0,1	0,2—0,3	0,4—0,5	0,6—0,7	0,8—0,9	1,0—1,5
Keratitis	0,001—0,04	6	1	1	2	1	1	—	—
	0,05 —0,1	64	—	—	2	8	9	18	27
	0,2 —0,3	11	—	—	—	1	1	2	6
	0,4 —0,5	7	—	—	—	—	2	2	3
	0,6 —0,7	2	—	—	—	—	—	1	1
Total eyes:		90	1	1	5	10	13	23	37
Infectious iridocyclitis	0,001—0,04	1	—	—	—	—	1	—	—
	0,05 —0,1	13	—	—	1	2	5	3	2
	0,2 —0,3	60	—	—	—	2	18	31	9
	0,4 —0,5	8	—	—	—	—	1	1	6
	0,6 —0,7	1	—	—	—	—	—	—	1
Total eyes:		83	—	—	1	4	25	35	18
Traumatic iridocyclitis	0,001—0,04	2	—	—	—	1	—	1	—
	0,05 —0,1	42	—	4	5	16	8	7	2
	0,2 —0,3	21	—	—	—	4	6	4	7
	0,4 —0,5	7	—	—	—	—	2	2	3
	0,6 —0,7	4	—	—	—	—	—	4	—
Total eyes:		76	—	4	5	21	16	18	22
Overall totals:		249	1	5	11	35	54	76	67

We have established that laser stimulation for acute inflammatory diseases of the eye is instrumental in accelerating epithelization of the cornea in the case of erosion, it is associated with attenuation of pain (within the first 2 treatments) and disappearance of pain (within the next 5-7 treatments), diminished corneal sensitivity (for 3-10 min), normalization of intraocular pressure (within the first 3-5 treatments), as well as anti-inflammation, anti-edema and high optical effects.

It was noticed that dark adaptation was diminished in 62 patients before treatment and was restored to normal in 60 cases during the first course of therapy and in the other 2 in the course of subsequent laser stimulation treatments. Visual field was narrowed before therapy in the range of 15-30° in 46 patients and reverted to the age-related norm after the first course of laser stimulation in all cases. Intraocular pressure reverted to normal in 22 out of 25 patients with hypertension after 3-5 treatments. Biomicroscopically,

proliferation of de novo formed vessels into the avascular zone of the cornea was observed in 19 patients (21.1%) with keratitis after 7-10 laser stimulation treatments; this was observed for 14-30 days after stimulation and disappeared thereafter without a trace. We failed to observe any complications whatsoever from laser stimulation in conjunction with other forms of therapy at either the short or long term. All of the patients reported considerable alleviation of the condition of the eyes during treatment, while those who could not sleep due to painful iridocyclitis were able to sleep and rest after the first or second session of laser stimulation, and this was reinforced with subsequent treatments. In 3 out of 249 patients, we observed mild tachycardia and a "metallic taste" of saliva during the treatment, which disappeared within 15-40 min after the treatment. Comparative analysis of duration of treatment of patients who underwent laser stimulation and those who did not revealed that laser stimulation for inflammatory processes of the cornea and vascular tract of the eye in conjunction with other forms of therapy had an anti-inflammation anesthetizing effect, reduced duration of treatment by 7-14 days, as compared to the control (the differences are statistically reliable), improved optic results and yielded a certain economic effect of combined therapy of patients with inflammatory diseases of the eye of diverse origin.

Conclusions

1. For the first time, it was established that spot delivery of type LG-78 helium-neon lasers has a stimulating effect on symptoms of acute inflammatory diseases of the cornea, iris and ciliary body of diverse etiology.

2. Laser stimulation, in conjunction with other forms of therapy, for patients with acute inflammatory diseases of the eye--keratitis, iridocyclitis of diverse origin--is associated with elimination of the pain component, reduction of corneal sensitivity, anti-inflammatory and hypotensive effect, which provides for good optical results, reduces treatment time and reduces the cost of therapy as a whole.

3. Long-term follow-up failed to demonstrate any adverse effects of laser stimulation (helium-neon laser) on either the affected eye or the patient's general condition.

4. The low-power type LG-78 helium-neon laser is recommended for clinical use in cases of acute inflammatory, traumatic and hypertensive processes in the eye.

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STIMULATING LASER THERAPY FOR CORNEAL DISEASES USING RUBY LASERS

Odessa OFTAL'MOLOGICHESKIY ZHURNAL in Russian No 4, 1982 (manuscript received 26 Jan 82) pp 204-207

[Article by Prof Ye. S. Libman, Yu. I. Kiyko, candidate of medical sciences and S. V. Ivanov, senior engineer, Central Scientific Research Institute of Expert Certification of Work Capacity and Vocational Guidance for the Disabled, Moscow Center for Rehabilitation of the Visually Handicapped]

[Text] In recent years, the attention of scientists has been specially drawn to the effects of low-power laser radiation on various biological processes. Experimental and clinical studies offer convincing evidence of the fact that low-intensity monochromatic laser radiation has stimulating properties, thanks to which it can help normalize certain pathological states.

Lasers generating in the red part of the spectrum, in particular helium-neon lasers, have the highest stimulating activity; low-powered helium-neon laser radiation is used in the treatment of trophic ulcers and wounds that do not heal for a long time (N. R. Ivanov et al., 1976; A. A. Gulyayev et al., 1976).

In 1977, Yu. A. Maryshev proved the possibility of using and marked therapeutic efficacy of subliminal energy levels of ruby laser radiation for some retinal diseases, while L. A. Linnik et al. developed, in 1978, a method for treating retinal dystrophy with low-power laser radiation, which turned out to be highly effective and is gaining increasing use in clinical ophthalmology. S. N. Fedorov and A. D. Semenov et al. (1979) reported good results of stimulation with use of low-energy helium-neon laser radiation in treatment of corneal dystrophy.

The above scientific information led us to assume that low-energy ruby laser radiation has a stimulating effect on repair processes in the cornea, as well as to investigate the possibility of using it for treatment of some forms of corneal pathology.

The cornea is rather sensitive to laser radiation in the red part of the spectrum, in spite of the fact that, according to Elkington (1970), it absorbs only 1.6% of the energy from a ruby laser. Previous experimental studies (Ye. S. Libman, 1973) revealed that, at rather low levels of energy (<0.03 J), ruby laser

radiation focused on the rabbit's retina elicits destruction of the corneal cover epithelium with subsequent irregular proliferation of epithelial cells, formation of areas of keratinization, as well as moderate lesions to the internal layers of the cornea. Similar morphological changes associated with scattered ruby laser radiation were demonstrated by Parr et al. (1967).

These data were indicative of the need to use as low energy doses as possible to obtain a stimulating effect. With this in mind, we administered laser stimulation by the following method: we used a domestic pulsed ophthalmic coagulator with an OK-2 free-mode ruby laser with 0.69 μm radiation wavelength and pulses lasting 10^{-3} s.

The treatment was delivered at an energy level corresponding to the instrument's pumped voltage of 1.4 kV. In order to reduce energy density, the following modifications were made in the instrument: 1) for maximum enlargement of the diaphragm the 5/08 filter was removed; 2) a 40D (from ShchL-56)* lens was inserted in the lens hood covering the condensing lens at a distance of 8 mm from its base, to additionally unfocus the laser beam. As a result of these changes, the diameter of the focal laser beam was increased to 2 cm at 10 cm away from the unfocusing lens, while energy density was reduced 150-fold, according to estimates. The laser beam was applied with the patient in supine position, under visual monitoring using a marker in the instrument that is set at the cornea with the patient looking to one side. The oblique direction of the gaze, which altered the angle of incidence of the beam, protected against its direct hit on the posterior pole of the eye and additionally lowered the intensity of radiation.

A series consists of 20 applications in 2 min. The number of series (3-10) administered at 1-2-day intervals, depends on the severity of the process and efficacy of treatment.

Laser stimulation was administered to 38 patients (40 eyes) ranging in age from 24 to 83 years, who had various diseases of the cornea, including recurrent herpetic keratitis, torpid bacterial ulcers of the cornea and dystrophic lesions to the cornea. The failure of prolonged (up to 6 months) and intense conservative therapy with use of diverse drugs and physiotherapy served as grounds for using lasers. Follow-up after laser stimulation constituted 2 to 6 months.

Our observations revealed that laser stimulation had a beneficial effect on all of the patients. It was particularly distinct in cases of herpetic keratitis. Already after 1-2 laser treatments, the patients reported subjective improvement: disappearance of pain, decreased photophobia and lacrimation. Objectively, epithelization of involved corneal regions started after the very first treatment in cases of dendriform keratits and it was completed 3-8 days after the start of therapy. A decrease in corneal infiltration was observed after 4-7 days, with definitive resorption of the infiltrate in 5-10 days, there remaining only a semitransparent cloud-like opacity in its place. Recovery time was somewhat later (15-20 days) in cases of metaherpetic and disciform keratitis, infiltrate resorption was less active and it started in the middle layers of the cornea then advancing to the front. Changes in deep layers and folds of Descement's

*Translator's note: ShchL--could be slit lamp [biomicroscope].

membrane persisted the longest. However, under the influence of laser stimulation, the inflammatory process was arrested in all cases, with restoration or considerable improvement of corneal sensitivity and visual acuity, the level of which depended on localization and intensity of residual corneal opacities.

Equally beneficial results were obtained from laser therapy on patients with torpid bacterial and trophic ulcers of the cornea. After 3-6 laser treatments, the ulcer cleared up, the tissue defect was filled, there was epithelization of superficial layers of the cornea and significant attenuation of inflammatory signs.

Encouraging results were also obtained with use of laser stimulation on patients with corneal dystrophy, in the presence of marked bullous keratopathy, which developed after cavitary intraocular operations (5 cases) or as a manifestation of endothelial-epithelial dystrophy (2 cases). All of the patients had received repeated courses of traditional therapy without any response.

Use of laser stimulation enabled us to obtain a good clinical response in 6 cases after only 3-4 treatments. Pain and photophobia disappeared after 1-3 sessions of laser therapy. Concurrently, there was considerable reduction of stromal edema, thickness of the cornea, resorption of endothelial deposits and rapid disappearance of bullous changes, edema of the epithelium with concurrent regeneration thereof, which was associated with restoration of transparency of the cornea and improvement of its sensitivity. Visual acuity improved in all cases. Laser stimulation was not effective enough in only one patient with secondary corneal dystrophy, in an eye with operated mixed-angle grade IIIa glaucoma. We failed to demonstrate any changes inherent in the deleterious effect of laser radiation with reference to deep refractive media and the fundus of our patients, either immediately after treatment or at the long follow-up term.

Apparently, the stimulating effect of low-energy ruby laser radiation on the cornea, which we demonstrated, must be interpreted from the standpoint of the general biological effect of lasers. Numerous studies, including those of Soviet scientists, have proven that there is a diversity of factors that arise under the effect of laser radiation on biological structures. The principal ones are thermal, kinetic, ultrasonic, electrochemical, photochemical and other effects. The nature of the effect depends on both the type and parameters of irradiation, as well as condition of the biological object. Experimental data indicate that photochemical reactions, resonance physiological facts, induced formation of free radicals and changes in enzymatic activity in tissues play a large part in the biotic effects of lasers (V. M. Inyushin, 1967; A. A. Gorodetskiy et al., 1968; R. Ye. Kavetskiy et al., 1969; Geeraets et al., 1963; Tomberg, 1964).

The aggregate of different reactions in response to low-energy laser radiation leads to activation of redox processes, intensification of repair, stimulation of proliferative and mitotic activity of cells and, apparently, because of this it accelerates tissue regeneration (M. T. Aleksandrov et al., 1976). These changes, which have been demonstrated with use of mainly helium-neon lasers, in biological objects are also inherent in tissues of the eye, including the cornea. Thus, L. A. Sevast'yanova (1966) demonstrated that there was a change in nature of cell division, increase in RNA and polysaccharide content in the white mouse cornea under the influence of scattered pulsed ruby laser

radiation. L. A. Linnik et al. (1979) and N. I. Usov et al. (1978, 1981) demonstrated intensification of RNA and DNA synthesis, in both the cornea and other structures of the rabbit eye after exposure to low-intensity ruby laser light. The authors justifiably believe that synthesis of additional amounts of DNA and RNA could be instrumental in increasing specific activity of cells and improving their adaptive capacities.

Activation of metabolic processes, increased viability of corneal tissue and its regenerative properties are apparently the principal factors in the stimulating effect of low-energy laser radiation, which distinguishes it from the mechanism of action of high-energy lasers. Thus, in the work of M. M. Krasnov et al. (1976), it was shown that, with argon lasers having coagulating parameters of radiation for treatment of herpetic keratitis, the local elevation of temperature, which leads to inactivation of virus and coagulation of epithelium it has stricken, is the principal factor determining the high therapeutic efficacy. The coagulating effect is apparently the main element of the therapeutic effect of ytterbium-erbium laser radiation, which was used with success by P. S. Avdeyev et al. (1981) in the treatment of some stromal diseases of the cornea.

Thus, our first clinical trial of low-energy ruby lasers for treatment of corneal diseases is indicative of its good stimulating effect and beneficial influence on normalization of some pathological processes in the cornea that respond poorly to treatment. However, the relatively small number of our cases and short duration of observation make it necessary to further investigate this method of stimulating laser therapy, and this will apparently reveal new possibilities of effective treatment of such widespread corneal diseases and trauma, administration of which is made easier by the broad availability of the domestic laser ophthalmic coagulator based on an OK-2 ruby laser.

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WORK OF NURSES IN LASER OPERATION ROOM

Moscow MEDITSINSKAYA SESTRA in Russian No 11, Nov 82 pp 47-48

KRAVTSOVA, V. K., senior nurse, Moscow Scientific Research Institute of Eye Microsurgery

[Text] The method of light coagulation of eye tissues in various diseases was first proposed by Kzerny in 1867, but its final establishment in ophthalmology was due to the work of Moran-Salas and Meyer-Shvikerat carried out in the mid-40's of this century.

Ophthalmology is the first area in medicine where laser has turned out to be a true assistant to physicians in combatting many serious diseases of the sight organ. Of greatest interest to ophthalmologists is the fact that a laser beam makes it possible to manipulate internal structures of the eye without the need for dissection.

Currently in our clinic we have an argon laser MF 2000 produced by MIRA company; an M-900 unit by "Coherent Radiation"; a domestic ophthalmologic ruby coagulator OK-2 and a modulated ruby laser "Yatagan-1".

During five years of the existence of a laser surgery division at the Moscow SRI of Ocular Microsurgery more than 30,000 individuals were operated upon for the following serious conditions: diabetic retinopathy, thrombosis of central vein of the retina and its branches, serious central choriopathies and a variety of maculopathies. In recent years especially active development was noted in prophylactic laser coagulation in pre-retinal detachment states in patients with high myopia, postsurgical aphakia, etc. Excellent results were obtained also in stimulations of retinal membrane of amblyopia patients using argon laser.

A nurse working with complex optical-electronic equipment used for diagnostic and therapeutic purposes must possess special habits. The necessity of constant monitoring during the operation not only of the sight organ but also of the overall condition of the patient places great responsibility on the nurse. Even though all our interventions are performed without opening the eye ball, the aseptic and antiseptic rules apply and must be followed strictly. Therefore, an important aspect of the work of a surgical nurse is

the control of sanitary state of all instruments in the work area. It is very important to maintain constant sterility of contact lenses and eye drops. Whenever the first signs appear of inadequate performance of ophthalmologic laser equipment, the nurse must turn it off and report the malfuhction to engineering and technical personnel.

Several decades ago one of the organizers and directors of public health said that when a patient leaves a physician's office in a bad mood, then he must have visited a bad physician. Good mood created in a patient is, to a large extent, due to the efforts of a nurse.

Nurses N. I. Dubyago and N. G. Semakova work in the division of laser surgery. N. I. Dubyago (First Laser OR), in spite of her youth, managed to gain respect and devotion of most of the patients and in addition mastered all the necessary technical skills. Successfully aiding the physicians in their work, she contributes her share to general medical care and prevention of dangerous complications to the sight organ. Her noble effort has often been acknowledged by the clinic administrators.

In the Second Laser OR, where most of the patients are children, the OR nurse N. G. Semakova takes charge. In spite of all difficulties, Nadezhda Germanovna finds a common language with the little patients, and she enjoys great respect from the workers of this division.

[148-7813]

BIOLOGICAL RESOURCES OF OCEANS

Moscow PLANOVOYE KHOZYAYSTVO in Russian No 1, Jan 83 pp 61-69

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[Abstract] Physiological, economic and organizational aspects of utilizing marine life as a source of protein for the human diet are discussed extensively. Planned consumption of fish and fish products in the USSR is 19 kilograms per capita by 1990. Demand for fish is higher in the Far East, Latvia, Estonia and Lithuania than in other parts of the USSR. The question of using marine sources for animal fodder is considered; despite the proven economic worth of using protein fodders prepared from marine algae in livestock farming, the absolute proportion of fish meal in fodders declined from 1.4 percent of feed in 1975 to 0.8-0.9 percent in 1980. Acquisition and processing of marine food sources should be increased to 4.2 million tons in 1985 and 4.3-4.5 millions by 1990. Plans for the expansion of the marine raw material base are discussed. Details are provided of plans to improve and expand exploitation of the continental shelf in the Far East.
No references.
[234-9642]

UDC 579.861.2:615.919]:616.98:579.861.2]-022.38-078

COMPARATIVE DATA ON ABILITY OF STAPHYLOCOCCUS AUREUS TO PRODUCE ENTEROTOXINS AND OTHER BIOLOGICALLY ACTIVE SUBSTANCES

Moscow VOPROSY PITANIYA in Russian No 4, Jul-Aug 82
(manuscript received 10 Apr 81) pp 70-72

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[Abstract] To explain a possible correlation between the formation of toxins by staphylococci and their enzymic activity, 201 various strains were tested, from which 190 could be assigned to Staphylococcus aureus strain by their culture and biochemical processes. The results showed a wide range of biological properties in these strains. Most of them exhibited coagulase activity and were able to oxidize mannitol under anaerobic conditions. Some of the strains appeared to have lost their enzymic activity either totally or at least partially. Literature reports that not all S. aureus were able to produce enterotoxins were supported by findings of the present study. Analysis of the data on pigment formation showed that most often the enterotoxic staphylococci produced golden pigment (39% of all cases) followed by white (14.5%), cream (13.5%) and yellow pigments (2%). The nonenterotoxic staphylococci also produced pigment but even to a lesser degree. It was concluded that pigment formation could not be used as a marker for enterotoxicity. The enterotoxin production appeared to be independent of the source of staphylococci, although this activity occurred most often in strains isolated from food poisoning. Figure 1; references 8: 4 Russian, 4 Western.
[164-7813]

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MECHANISM OF ACTION OF BOTULISM TOXIN ON NEURONES OF TRIGEMINAL NERVE MOTOR NUCLEUS IN RATS

Moscow PATOLOGICHESKAYA FIZIOLOGIYA I EKSPERIMENTAL'NAYA TERAPIYA in Russian No 5, Sep-Oct 82 (manuscript received 28 May 81) pp 65-68

MIKHAYLOV, V. V. and KUNEYEV, N. V., Chair of Pathological Physiology (Director - prof. V. V. Mikhaylov) Moscow Medical Stomatological Institute imeni N. A. Semashko

[Abstract] The goal of the present work was to determine whether the functional state of the motoneurons of trigeminal nerve is affected at different periods after development of botulism paralysis of the masseter muscle. White randomly bred rats were used in these experiments. The results showed that the highly polarized motoneuron function was depressed even during the early stage of the development of masseter muscle paralysis; these motoneurons are related to "rapid" phase motoneurons. In the late phase of paralytic syndrome, intensification of these changes is noted along with a spread to a large number of nerve cells. In this respect, an analogy is observed between the action of botulism toxin's effect and the motor centers of cerebral spine. Changes in the composition of the fibers of masseter muscle during botulism result from the depression of the trophic effect of "phase" neurons on the "rapid" muscle fibers, since the dissociation of "phase" and "tonic" effects on skeletal muscles leads invariably to a change in the fiber composition. Figure 1; references 8: 4 Russian, 4 Western.
[147-7813]

UDC 612.014.41

EFFECT OF INCREASED PRESSURE OF ENVIRONMENTAL GAS ON CONTENT OF SODIUM, POTASSIUM AND WATER IN BLOOD AND TISSUE OF WHITE RATS

Leningrad FIZIOLOGICHESKIY ZHURNAL SSSR IMENI I. M. SECHENOV in Russian
Vol 68, No 11, Nov 82 (manuscript received 3 Oct 81) pp 1569-1572

KISLYAKOV, Yu. Ya., LEONT'YEV, V. G. and SOKOLOVA, M. M., Laboratory of Blood Transport Function (Director: Yu. Ya. Kislyakov) at the Institute of Physiology imeni I. P. Pavlov, USSR Academy of Sciences; Instrumental Analysis Group (Director: V. G. Leont'yev) at the Institute of Evolutionary Physiology and Biochemistry imeni I. M. Sechenov, USSR Academy of Sciences, Leningrad

[Abstract] White Wistar male rats were exposed to 2.5 and 5.0 atm pressure of a nitrogen-oxygen atmosphere (partial pressure of oxygen was kept at 0.2 atm) for 5 hrs. Decompression lasted either 1-1.5 min (fast) or 18-20 min (slow). The results showed that a short time exposure to high nitrogen-oxygen pressure leads to altered concentration of potassium in body fluids and in tissue, a slightly decreased volume of intracellular fluid, but rather stable levels of sodium, tissue fluid and intracellular volume. It was noted that only 70% of experimental animals showed these changes. Why the other 30% of animals remained unaffected was puzzling and will require further study. References 10: 8 Russian, 2 Western.
[157-7813]

UDC 616-056.7:577.21

CORRECTION OF INHERITED GALACTOSEMIA SYMPTOMS IN W/SSM RATS BY MEANS OF ENZYMATIC IMPRINTING

Moscow GENETIKA in Russian Vol 18, No 3, Mar 82
(manuscript received 4 Aug 80; after completion 8 Jul 81) pp 428-433

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[Abstract] In earlier studies an animal model was developed for human inherited galactosemia: the W/WSSM rat, which spontaneously developed cataracts, hepato-splenomegaly and other symptoms. Using this model, the following hypothesis was tested experimentally: does neonatal administration of galactose (enzymic imprinting) to animals with galactosemia stabilize the activity of inducible enzymes transforming galactose. One could assume that such an action would correct enzymic irregularities and phenotypic manifestations of inherited galactosemia. Galactose (at a dose of 2 mg/g body weight) in physiologic solution was administered intraperitoneally to W/SSM rats from the first to the 14th day postnatally; control animals received only the physiological solution. The experimental animals exhibited sustained decrease in the uptake of ^{14}C-galactose by the erythrocytes, an increased activity of glucose-6-phosphate and decreased activity of galactose-1-phosphaturidyl transferase. Typical clinical symptoms of galactosemia practically disappeared in animals getting galactose; the precataractal damage of the lens was similar to that of the control group; the liver and spleen returned to normal. The principal cause of galactosemia was found to be due to intensified transfer of galactose and its accumulation, along with toxic metabolites, in the cells. It was postulated that enzymic imprinting could be used for phenotypic correction of inherited pathologic states due to the damage of enzymatic activity. Figures 3; references 24: 11 Russian (1 by Western authors), 13 Western.
[129-7813]

UDC 547.96

NEW EVIDENCE FOR FUNCTION OF S-100 BRAIN-SPECIFIC PROTEINS: INTERACTION WITH NERVE TISSUE TUBULIN

Moscow BIOKHIMIYA in Russian Vol 47, No 11, Nov 82
(manuscript received 1 Oct 81) pp 1835-1838

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[Abstract] Affinity chromatography was employed to demonstrate the binding of brain-specific protein S-100 protein to tubulin derived from bovine brain, employing S-100 immobilized on CNBr-Sepharose 4B. Evaluation of the elution patterns showed that one molecule of tubulin was bound per six molecules of S-100 and that binding was Ca++-dependent. Furthermore, elution with 50% glycerin showed that hydrophobic interactions between S-100 and tubulin were also a factor in specific binding. While the physiologic significance of such binding remains speculative, an attractive hypothesis would be to suggest that such interaction may have a role in various intraneural transport mechanisms. Figures 1; references 17: 4 Russian, 13 Western. [186-12172]

UDC 612.822.3.087 + 612.076

CHARACTERISTICS OF INTERCENTRAL CORRELATIONS OF HUMAN BRAIN BIOPOTENTIALS DURING REALIZATION OF MUSCULAR PERFORMANCE ON BACKGROUND OF RHYTHMIC BLINKING LIGHT

Alma-Ata IZVESTIYA AKADEMII NAUK KAZAKHSKOY SSR in Russian No 4, Jul-Aug 82 pp 72-74

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[Abstract] The goal of the present work was to study the characteristics of spacial synchronization of the biopotentials of some regions of human brain cortex during the realization of some exercise with a concomitant, confusing blinking light of varying frequency. The changes in the relationship of frequency to phase in the investigated brain cortex indicate that the functional relationship between the higher segments of the directive system became worse as a result of the confusing action of the blinking light. These changes were observed on the background of lower biochemical effectiveness, supported by analysis of the duration of one's balance (when exposed to the blinking light, the subjects maintained their balance only 40-50% of the time they could do it under normal conditions). Thus, light blinking at frequencies close to the parameters of the biopotential frequencies caused a disturbance

in the functional relationship between the cortex areas participating in realization of movements and the lower mechanical effect of an exercise. Figure 1; references 4: 3 Russian, 1 Western.
[167-7813]

UDC 616.831-008.922-1-088.64-036.11.07

BLOOD-BRAIN BARRIER STATUS IN COMPLETE CEREBRAL ISCHEMIA

Minsk VYESTSI AKADEMII NAVUK BSSR in Belorussian No 6, Nov-Dec 82
(manuscript received 12 Feb 82) pp 97-101

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[Abstract] Investigations were conducted on the uptake by the various brain structures of ^{32}P from the blood in normal control rabbits and animals subjected to complete cerebral ischemia for various periods of time. The results showed that in outbred control animals ^{32}P distribution was variable within the brain proper and that the highest concentration of radioactive phosphorus was measured in the hypothalamus (10.08 $\pm$ 1.08%), which was 1.5 to 3-fold greater than the concentrations in the other structures and formations, but ten-fold less than in the pituitary and 7.5 to 8.6-fold less than in the brain envelopes. Cerebral ischemia elicited variable changes in the cerebral levels of ^{32}P, consisting of both elevation or depression depending on the conditions. In general, the greatest changes in the permeability of the blood-brain barrier were seen in the case of the spinal cord, hypothalamus, pituitary, and the cerebral meninges, while the barrier mechanisms of the medulla oblongata, pons valorii, and the horn of Ammon showed the least susceptibility to ischemia. References 12: 1 Belorussian, 11 Russian.
[169-12172]

UDC 612.015.3+577.12

EFFECTS OF GLYCOLYTIC INTERMEDIATES ON ADAPTATION TO PHYSICAL OVERLOAD

Minsk VYESTSI AKADEMII NAVUK BSSR in Belorussian No 5, Sep-Oct 82
(manuscript received 1 Mar 82) pp 71-73

KONOPLYA, Ye. F. and FIL'CHENKOV, G. N., Gerontology Section, Belorussian SSR Academy of Sciences

[Abstract] Untrained male Wistar rats subjected to physical overload (running) showed to two-fold or greater increase in blood lactic acid concentration which persisted for an hour. Pretreatment of the animals with a mixture of 0.2 M dihydroxyacetone, 0.1 M pyruvate, and 0.1 M inorganic phosphate (20 ml/g) 45 min before the stress test prevented excess lactate

accumulation and improved performance presumably due to activation of aerobic respiration and redox processes. The increase in hematocrit seen in the untrained animals subjected to physical stress was somewhat attenuated in the pretreated animals. References 8: 1 Russian, 7 Western.
[165-12172]

UDC 578.087.84

STUDY OF FREQUENCY DEPENDENCE OF ACOUSTICAL CHARACTERISTICS OF BIOLOGICAL TISSUE BY THE RESONATOR METHOD

Moscow AKUSTICHESKIY ZHURNAL in Russian Vol 27, No 6, Nov-Dec 82
(manuscript received 8 Oct 80) pp 895-900

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[Abstract] Since pathological changes in tissues are reflected in changes in ultrasound velocity and attenuation, as well as frequency dependence, it is essential to develop methods for measuring acoustical characteristics of tissues with reaonsable accuracy and to study the relation between such dependences and tissue type and condition. A simple method based on the direct determination of amplitude-frequency characteristics of an acoustic resonator containing the tissue specimen was used. A small computer controlled the operation of a programmed sweep generator the frequency of which was varied. The spectrum of the high-frequency signal from the resonator piezoreceiver was analyzed by a computer-controlled sequential spectrum analyzier. Acoustical characteristics of biological tissue were measured with the use of a transducer with the tissue specimen (0.02 cm^3) between its piezotransformers. Accuracy of the method was 0.02% for velocity and 5% for the attentuation coefficient. This method was used to measure acoustical characteristics of liver, myocardial and spleen tissues from female albino rats in the frequency range of 1.7-17.4 MHz. Standard error for ultrasound velocity (V) was $\pm$0.04% and for the attenuation coefficient (α) $\pm$10%. Values obtained by the resonator method for α, $\Delta\alpha/\Delta f$ and n (slope of $\alpha(f)$ in a logarithmic plot) in the 1-10 MHz range coincided with literature data, obtained by the pulse method, with the exception of data for the myocardium. The discrepancy was attributed to the use of a whole organ in the pulse measurements. Values for V(f) were higher but more accurate than those obtained by a modified echo-pulse method. Frequency dependencies and ultrasonic attenuation correlated with tissue protein composition; this correlation was retained at all frequencies. Figures 4; references 16: 7 Russian, 9 Western.
[194-9307]

UDC: 616-084.3

ROLE OF REHABILITATION THERAPY IN SYSTEM OF DISPENSARY CARE OF THE PUBLIC

Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian No 8, Aug 82 (manuscript received 9 Dec 81) pp 20-24

[Article by V. A. Minyayev, I. V. Polyakov, Ye. A. Boyarinova, L. V. Kochorova and N. S. Sokolova, Department of Social Hygiene and Public Health Organization (headed by Prof V. A. Minyayev), First Leningrad Medical Institute imeni I. P. Pavlov]

[Text] At the present stage of development of public health care, the purpose of dispensary services is, in the first place, to preserve and strengthen the health of healthy people and, in the second place, to restore the health of the sick. Preventive measures are acquiring increasing significance with improvement of socioeconomic living conditions and general hygienic working and living conditions.

In recent years, the role of the rehabilitation service has increased. There are specialized hospitals and departments in hospitals, and special centers are opening in polyclinics. A system has been developed for rehabilitation in stages, which is quite effective for a number of diseases--myocardial infarction, trauma, neurological diseases, etc.

Rehabilitation therapy in stages is being used for an increasing number of diseases. The most varied types of medical therapeutic and preventive institutions are becoming involved in its administration.

In the opinion of I. K. Shkhvatsabaya et al., patient rehabilitation refers to a set of medical and social measures aimed at restoring health and work capacity, preventing exacerbations of disease, its progression and lowering mortality. It is stressed in a report of the WHO European Regional Office, that the purpose of rehabilitation is to provide optimum social conditions for patients. G. S. Yumashev and K. Renker include in rehabilitation restoration of functions, adjustment to everyday life, involvement in the work process; emphasis is laid on the role of early initiation of rehabilitation, individually selected rehabilitation measures, continuity, duration and combined use thereof.

We consider it important to investigate the role of rehabilitation therapy in a combined approach to safeguarding the health of the people of our country, to its relationship with dispensary observation. A comparison of the substance and purposes of dispensary care and rehabilitation therapy enables

us to discern that their goals are the same (improving the health of the public) as are the measures--prolonged, adequate and combined. In this regard, we were impressed by an assessment of relationships between rehabilitation and dispensary care. While B. D. Petrakov and V. V. Yermakov consider rehabilitation to be one of the elements of dispensary care, G. S. Yumashev and K. Renker, on the contrary, consider dispensary care to be a form of rehabilitation therapy. We consider it obvious that the statements of B. D. Petrakov and V. V. Yermakov are valid. Diagram 1 illustrates the relationship between dispensary care and rehabilitation therapy.

Diagram 1. Diagram of main elements of dispensary care and rehabilitation therapy

Elements of dispensary care	Elements of rehabilitation therapy
Study of public health and factors that influence it. Distribution of public according to health groups	Investigation of epidemiology of different diseases. Determination of expediency of methods and time for rehabilitation therapy
Keeping record of health and sick groups	Keeping records of patients requiring rehabilitation therapy
Active observation of health status of healthy people. Primary prophylaxis--social and individual	--
Early, active improvement of health, combined patient therapy in stages	Early, active, combined rehabilitation therapy for the sick, in stages. Functional, social and psychological rehabilitation
Active, systematic observation of those who are recovering; vocational guidance, visiting nurse services. Secondary prevention of recurrences, exacerbations, temporary and persistent disability	Prescription and monitoring of maintenance therapy. Vocational therapy. Vocational guidance
Investigation of migration [movement] of those under dispensary supervision, providing succession [continuity] of therapeutic and preventive care, its scope and quality	Investigation of migration of groups subject to rehabilitation therapy; providing succession of rehabilitation therapy, scope and quality of rehabilitation measures
Determining the efficacy of dispensary care	Assessment of short- and long-term results of rehabilitation therapy

We see from it that rehabilitation therapy is merely a part (though an important one) of the general system of dispensary care; it deals with the most difficult group: individuals who have sustained serious, acute diseases or who suffer from chronic diseases; adequate rehabilitation therapy in stages has a beneficial

effect on efficacy (medical, social and economic) of medical care for patients and, consequently, efficacy of dispensary care.

Diagram 2. Organization of rehabilitation therapy for patients with myocardial infarction*

Key:
a) patient with myocardial infarction
b) polyclinic--territorial or for place of work
c) district internist
d) cardiologist
e) cardiological department for patients with myocardial infarction
f) hospital
g) cardiological dispensary
h) department of rehabilitation therapy
i) cardiological sanatorium
j) regular brigade. Specialized cardiological brigade
k) emergency care
l) intensive monitoring ward and intensive care ward
m) intensive care [therapy] ward

The correlation between dispensary care and rehabilitation therapy becomes more comprehensible if we examine organization of medical care for different groups of patients. Organization of rehabilitation in stages is examined here on the

*The solid line shows the optimum sequence of stages in treatment of myocardial infarction patients and the dotted line, a possible sequence.

example of myocardial infarction (the sociohygienic aspects of this disease have been under study in this department for a number of years).

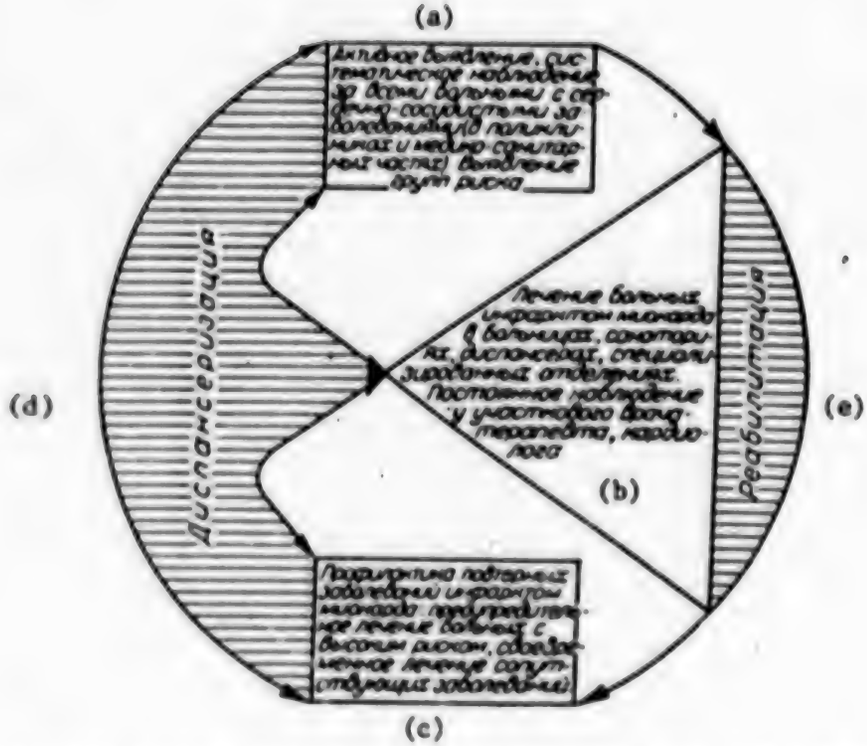
The first stage consists of rendering highly-qualified medical care by specialized emergency cardiological brigades; the second is mandatory hospitalization of patients with acute myocardial infarction in medical or cardiological departments with intensive care and monitoring wards, where the full range of modern intensive medical care is used, with constant monitoring of dynamics of the disease and condition of patients; the third refers to subsequent therapeutic and preventive measures in hospital departments of rehabilitation therapy, then in local cardiological sanatoriums; the fourth consists of follow-up and treatment of patients by a district internist, as well as polyclinic or dispensary cardiologist (Diagram 2).

Of all patients hospitalized because of large-focus myocardial infarction, 24.9% spent the acute period of disease in cardiological departments. Of all patients discharged from hospitals, 21.1% were referred for rehabilitation therapy; 7.3% were treated by a cardiologist at a polyclinic, and the rest were followed up by a district internist. The expert method was used to determine that 41.5% of the patients should be transferred to rehabilitation therapy departments of hospitals and 37.2% to sanatoriums. The bed requirements for patients with large-focus myocardial infarction at different stages of rehabilitation therapy constitute 3.32 per 10,000 adult population, of which 2.35 beds are intended for treatment in the hospital at the acute stage of illness, 0.54 for treatment in hospital rehabilitation therapy departments and 0.43 for treatment in cardiological sanatoriums.

At the present time it can already be considered established that treatment results are better in patients who have undergone the complete course of rehabilitation therapy in stages: mortality and disability rates are lower, a higher percentage returned to professional work, i.e., the efficacy of the rehabilitation service, which is developing actively in our country, has been proven. However, there are also difficulties. For example, it is difficult to provide continuity [succession] in rendering care to patients at different stages, in different types of therapeutic and preventive institutions. Attention has been called to this, in particular, by R. M. Akhrem-Akhremovich et al., D. D. Shcherbatkin, A. I. Yanushkevichus and N. B. Misyunene.

The correlation between elements of rehabilitation therapy and dispensary care of myocardial infarction cases and the necessity of continuity are determined by their objectives (see Figure).

A follow-up [control] card was developed in our department on rehabilitation therapy of myocardial infarction, which permits evaluation of the extent of treatment of such cases. Use of this card in practice will help the cardiological dispensary concentrate the most important clinical and organizational information required for future refinement of dispensary care of the public, effective rehabilitation therapy of these patients as a whole and at each stage, to investigate the short- and long-term results of treatment, survival time and work capacity of patients. It is obvious that use of an analogous system would also be desirable for other diseases, particularly under conditions of universal coverage of the public by dispensary care.



Correlation between main tasks of dispensary care and rehabilitation therapy for patients with myocardial infarction

Key:

a) active detection, systematic observation of all patients with cardiovascular diseases (in polyclinics and medical sections); detection of risk groups
b) treatment of patients with myocardial infarction in hospitals, sanatoriums, dispensaries, specialized departments; constant observation by district internist, cardiologist
c) prevention of recurrence of myocardial infarction: preventive treatment of high risk patients, early treatment of concomitant diseases
d) dispensary care
e) rehabilitation

There is also a need to work out indications for methods of rehabilitation therapy under polyclinic conditions for patients suffering from different stages and with different course of diseases. There should also be establishment of distinct methodological approaches to rehabilitation therapy in stages, which would be the same for hospitals, polyclinics and sanatoriums.

There are still several questions to be answered: Who should be considered responsible for dispensary care and a complete course of rehabilitation therapy in stages (physician in what specialty, what specific therapeutic and preventive institution)? Where should all the information about course of illness and patient treatment be directed? Who should investigate the efficacy of each stage and the entire system of rehabilitation therapy and dispensary care of a given group of patients? What is the role of the district internist, shop physician and cardiologists of polyclinics and dispensaries?

With answers to these questions, it will be possible to provide continuity in different medical institutions and for different specialists following the same system of measures to strengthen the health of the public, organize constant and dynamic observation and, when necessary, administer rehabilitation therapy.

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10,657
CSO: 1840/135

UDC: 614.2(47+57)

SOCIOHYGIENIC STUDY OF PUBLIC HEALTH AND LIFE-STYLE

Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian No 7, Jul 82 (manuscript received 14 Oct 81) pp 3-9

[Article by Yu. P. Lisitsyn, corresponding member of the USSR Academy of Medical Sciences]

[Text] In his report to the 26th CPSU Congress, Comrade L. I. Brezhnev noted that "we have yet much work to do to upgrade the socialistic way of life.... This is one of the inalienable elements of the Party's social policy, whose objective is the welfare and happiness of the Soviet people."* For this reason, investigation of life-style, primarily socialistic, its role, distinctive features and advantages acquires first and foremost importance.

To date several comprehensive works have been published concerning life-style as a philosophical and sociological category; the typical features, aspects of the socialist way of life have been singled out, which make it possible to undertake its modeling. Life-style is qualified as a historically determined type, form of human activities or a specific means of activity in the material and spiritual areas, as the aggregate of the most relevant features of activity.

Among the latter, mention is made of labor (industrial), social, physical, etc., types (forms) of activity, activities that act together with social and natural factors (living conditions) and have a direct effect on man's health. In a socialist society, which forms a socialistic life-style, a healthy way of life is formed as an active way and means of prevention (first of all, primary prevention [prophylaxis]). A healthy life-style can be viewed as an extremely important category of social hygiene, which requires (as does life-style as a whole, in particular the socialistic way of life) comprehensive investigation. Combined sociohygienic studies acquire special significance.

Such studies make it possible not only to comprehensively study and analyze the role of social conditions and factors, demonstrate the most fully and forcibly the social determination of health status of the public and groups thereof, but come right up to investigation of the medicosocial aspects of life-style as the aggregate of the most typical, characteristic forms, types of activity,

*"Proceedings of the 26th CPSU Congress," Moscow, Politizdat, 1981, p 64.

activity of individuals, social groups, strata, classes of population in the unity and diversity of living conditions. Such studies demonstrate the direct influence of life-style on the health of the people (unlike the mediated effect of many social conditions).

Combined sociohygienic investigation of different aspects of life-style started to develop in the 1960's. This was aided by the intensive development in our country of sociology, one of whose branches became medical sociology, which makes use of sociological methods in sociohygienic studies.

To date, sociohygienic and particularly combined [complex] studies have established a correlation between social conditions and public health indicators. Since the problem was formulated relatively recently, there are still few sociohygienic studies dealing with life-style. Among the first such studies, were those of the staff of the Department of Social Hygiene and Public Health Organization at the Second Moscow Medical Institute imeni N. I. Pirogov. It is essentially from these studies that we took our examples about the influence of different aspects of life-style on the health of groups studied. It should be stated right away that, even in choosing such examples, it is very difficult to separate the influence of life-style from that of living conditions, since life-style and living conditions are an inseparable entity, as it follows from the very concept of life-style.

A vivid variant of combined sociohygienic investigation of life-style is the so-called family survey, which covers as many aspects as possible of family life and their influence on the health of family members--financial security, cultural level, housing conditions, diet, child upbringing, intrafamily relations, availability of medical care, etc. Expressly such studies, which were already conducted in the 1960's in the Department of Social Hygiene and Public Health Organization, Second Moscow Medical Institute, demonstrated a number of distinctive features that sociohygienists had not noted before. For example, differences in financial security of families (differences in income per capita) do not have an appreciable effect on health indicators of family members and availability of medical care. Thus, in the study of O. V. Grinina (1964) of blue- and white-collar workers at one of the large plants in Moscow, no noticeable differences were found in overall morbidity among representatives of different income ["budget"] groups.

These findings, which are in contradiction to the traditional conceptions of the direct effect of material living conditions on health, served as an impetus for us to form the conception of social homogeneity of the health status of the people in the USSR and other socialist nations, and compelled us to search for other factors that have a direct effect on health. It was also noticed that differences in housing conditions, in size of living space, sometimes had no immediate effect on health. But distinctions referable to behavior, the way in which material conditions are used (availability of housing, income, etc.), i.e., activity related to these factors (intrafamily relations, psychological climate, distribution and utilization of financial opportunities, etc.), different aspects of life-style had a most direct effect on the different health indicators studied. In this respect, the factors determining the birthrate are quite demonstrative (V. K. Kuznetsov, 1971). It was noted that a woman's decision to have a child or interrupt her pregnancy depends on living

conditions (financial security, housing conditions, alcohol abuse by husband, etc.). However, these are not the principal factors. The relations between couples have the strongest influence on this decision. When housing and financial conditions were satisfactory but there were tense relations, the number of abortions was not smaller, and sometimes larger than among women with unfavorable housing and financial conditions who got along well with their husbands. The family situation, nature of relations between its members, particularly between husband and wife, largely determine fertility, affect the outcome of pregnancy and influence different health indicators. The family microclimate, intrafamily relations, family situation, which determine the life-style, form the health status in many respects. The study of N. I. Makel'skaya (1976) demonstrated very clearly the adverse influence of conflict situations in the family, the womens' position in the family, on outcome of parturition.

We could cite many more examples of the effect on health of adverse family factors, i.e., in essence, life-style factors. Thus, L. G. Lekarev (1977) et al. established that in single-parent families (without a husband), children were sick twice as often as in two-parent ones. The composition and condition of families also have an appreciable effect on the incidence of different diseases. For example, in single-parent ["incomplete"] families, the incidence of pneumonia among children is four times higher than in complete families (T. L. Yermokhina, 1978). An unfavorable psychoemotional climate is also instrumental in more serious course of rheumatism in children and adolescents (V. S. Polunin, 1972; Ye. N. Savel'yeva, 1980, and others); in such families there are 2.3 times more children with peptic ulcers and 1.7 times more with gastroduodenitis (Yu. Ye. Lapin, 1977). Poor family relations, particularly between mates, create a morbid background and are sometimes the immediate cause of onset and development of the most diverse diseases. This is indicated by the studies of the staff in the department of the Second Moscow Medical Institute and other institutions. For example, G. P. Arkhipova arrived at such conclusions in her doctoral dissertation (1974), dealing with the health status of urban and rural population of Tambov Oblast.

Many authors of combined sociohygienic studies single out, among the most relevant factors determining health indicators, family relations. The "family" factor is found to be significant even with regard to diseases whose onset, it would seem, was related only to concrete physical factors. For example, Yu. G. Yakovlev mentions in his doctoral dissertation, which deals with a complex sociohygienic study of lumbosacral radiculitis (1977), industrial and family factors among causes of this disease, along with anatomical defects, trauma, considerable physical strain, cooling and others. More and more observations are being accumulated that point to the role of the psychological climate, intrafamily relations, in preserving health and onset of diseases.

Such observations disclose with particular vividness the significance of life-style.

Of course, it is not only individual factors, but a set thereof that constitutes family life-style as one of the deciding means of influencing the health of people. For this reason, studies whose authors try to investigate and assess the aggregate of life-style factors, including psychological, demographic (size and composition of family), etc., are of particular value.

There has been convincing demonstration of the influence on health of combinations of different aspects of life-style and living conditions in the doctoral dissertation of I. P. Katkova (1978), dealing with medicosocial aspects of birthrate. Having studied, among others, the problem of incidence of abortions, I. P. Katkova paid attention to the fact that with the same or very similar level of financial security and housing, as well as education, women of different social groups resort to abortions more often in Alma-Ata than, for example, in cities of Lithuania. The differences are attributed to distinctions referable to behavior, culture, traditions, habits, etc., i.e., distinctions of life-style which are assessed here as the deciding factor.

As we know, the regimen, daily schedule of family members is one of the complex indicators characterizing life-style. Quite a few studies, including those conducted by the staff of the department at the Second Moscow Medical Institute and dealing primarily with the schedule for children, demonstrated the prime significance of this factor. Disruption of the schedule for rest, sleep, meals, classroom schedule influences with a high degree of reliability the onset and course of different diseases (cardiovascular, rheumatism, gastrointestinal, neuropsychiatric and others) and has an adverse effect on overall morbidity, physical and intellectual development. This link is manifested already in infancy (N. V. Polunina, 1974). N. G. Karlsen (1980) divided all the school children he studied into five groups according to health status, having proven that expressly the school, rest schedule, nature of social work, family situation and other life-style factors determine their health status; the school children are put in one of the health groups according to these factors, and they determine the medical steps (prevention, treatment, etc.). According to the study of Ye. N. Savel'yeva (1980), every other child suffering from rheumatism has low social activity.

We can illustrate the adverse effect of certain conditions and distinctions of life-style on health with the example of student families, individuals who combine studies with work (M. I. Panachina, N. G. Veselov, O. V. Frolova, N. N. Stepanova, G. S. Muchiyev and others).

There is particularly vivid manifestation of the effect of life-style on health when we compare the health status of families that adhere or not to a daily schedule (V. D. Sokolova, 1979). Drastic differences in health status were reported by B. Mamitkulov (1979): in a group of children who adhered to a schedule for meals, sleep, outings and training 60% were seldom sick and only 9% were often sick (versus 17.8 and 37.8% in a group of children who did not follow a schedule, whom the author placed in the group with low social activity). G. I. Vakhristyukh (1973) noted a very substantial relationship between the health status of children and life-style: morbidity in infants up to 1 year of age constituted 4648 cases per 1000 infants in a group with adverse life-style factors, versus 2646 cases in the group with good factors.

These are examples of mainly family-by-family studies. In them, work, social, physical activity and the psychological aspect of interpersonal relations are viewed as different aspects of life-style; these studies assess the influence of these factors on different indicators. But, as we have mentioned, we can find examples of the significance of life-style in other than family studies, they can also be found in the course of many combined sociohygienic investigations.

Such examples are particularly convincing when studies are made of diseases that are viewed exclusively from the biomedical point of view. We have already mentioned the established influence of psychological factors on development of radiculitis. It is even more important to demonstrate the effect of at least some aspects of life-style on development of malignant tumors. In spite of the small number of scientific investigations of this matter, we still encounter publications whose authors note a link between incidence of malignant neoplasms, mortality due to them and life-style. For example, in one of the studies conducted in Great Britain and mentioned by the well-known statistician, W. Logan,* it was demonstrated that mortality due to cancer of the stomach in men whom foreign sociologists classified in the so-called highest, or first social class, i.e., individuals in the most prosperous strata of society, constituted 61 cases per 100,000 people; this indicator was 2.5 times higher, 150/100,000 in the fifth "social class" (the unemployed, low-salaried, common laborers, etc.). Such facts are also cited in other publications, for example, in the so-called White Paper ["book"] (United States), which reported on some indicators of public health status.

As we have already mentioned, there are no differences in the USSR and other socialist countries that are indicative of social heterogeneity of public health, of a contrast, heterogeneity in life-style of different social groups. But the differences in life-style do affect oncological morbidity. Here are some examples from complex sociohygienic studies. In the dissertation of O. A. Veber concerning the distinctions in incidence of stomach cancer in West Siberia (1980), it was demonstrated that unfavorable life-style factors (disruption of meal schedule--irregular mealtimes, systematic intake of cold meals [snacking], heavy meals at night, overeating, eating fried food, spices, very hot food, etc., combined with alcohol abuse and smoking, contact with occupational deleterious factors, heavy physical labor, heavy neuropsychological experiences, etc.) influence the onset and development of this disease. He concludes that a stable life-style (social "portrait") is formed by the age of 40 years, in the form of a set of typical exogenous and endogenous factors that are instrumental in onset of stomach cancer.

The results of the study of N. G. Krivobokov (1974) of incidence of malignant tumors in Stavropol Kray are indicative of the role of life-style and some of its unfavorable factors (risk factors). The probability of stomach cancer is highest among individuals who drink, eat irregularly and seldom (twice a day), often eat fried foods, salty food, spices and who smoke a lot. Place of residence (geographic conditions), migration of the population, alcohol and, particularly, cigaret abuse influence the incidence of lung cancer; skin cancer develops under the effect of the same factors and, in addition, hygienic habits--washing face with hot water; family situation and others are also significant.

V. B. Smulevich obtained data similar to those described above in his sociohygienic study of the incidence of malignant neoplasms in the motor vehicle driver occupational group (1977). Poor work and rest schedule, changes in work schedules, absence of stable mealtime, work and rest schedules, and

*Yu. P. Lisitsyn, "Some Social Problems of Medicine," Moscow, Znaniye, 1975, p 41.

other risk factors lead to a higher incidence of cancer of the stomach, larynx, lungs and blood than in men as a whole.

Alcohol abuse was mentioned among tumor risk factors. Unfortunately, alcoholism and heavy drinking affect more than oncological morbidity. Alcohol abuse and smoking are the most vivid examples of nonhygienic behavior.

Without dwelling in detail on this problem, to which many publications and studies are devoted, let us mention that, thus far, there have been few sociohygienic studies to demonstrate the tendency toward incidence of alcoholism, its social causes, influence on health, economic indicators, moral and psychological consequences of alcoholism and heavy drinking. There are even fewer studies in this direction of smoking. Sociologists and social hygienists have demonstrated conclusively that alcohol abuse and heavy smoking are attributable essentially to sociopsychological factors, although there are no grounds to deny that some predisposition for thesebad habits also exists. In spite of the fact that socialism eradicates the class-related roots of so-called social diseases, including alcoholism, some sociopsychological factors, which have been retained as the heritage of the past and reappear due to certain unfavorable behavior patterns, continue to have an effect. In the general opinion of specialists, under the conditions in our country, the following factors lead to alcohol abuse: following the tradition of celebrating certain events in public and personal life by consuming alcoholic beverages, lenience, indulgence and even approval of heavy drinking, flaws in upbringing in the home, school, work group, inadequate health education work, family conflicts, confusion, etc. As a rule, the example of older friends and surrounding people are the immediate cause of acquiring the drinking and smoking habits. These habits, which change into disease in some people, develop on the fertile soil of low cultural level, ignorance about how to spend one's leisure time so as to benefit health and spiritual development. A stable set develops for alcohol abuse and smoking. Enough observations have been accumulated to confirm this. They include the studies of the staff of our department (Yu. P. Lisitsyn, N. Ya. Kopyt, V. G. Zaporozhchenko, V. P. Bokin, O. P. Chekayda, Ye. S. Skvortsova and others) that deal with alcoholism and heavy drinking. It was established that over half the people who drink to excess were raised in families where alcoholic beverages were consumed regularly; over 95% of those who overdrink first started drinking early, before the age of 15 years, under the influence of family members, peers, friends, people around them, and most often closest relatives were the ones who offered an alcoholic beverage for the first time to children and adolescents. The influence of different life-style factors, alcohol addiction risk factors was given a rating on the basis of statistical analysis of a representative number of cases of adolescent drinking, in studies conducted in our department. Among the first 10 out of 18 such factors, the following were named: leisure time spent without purpose; early introduction to alcoholic beverages; conflict relations in the family; alcohol abuse by father; inattention of parents to studies and leisure time of the adolescent; low level of father's education; low level of mother's education; alcohol abuse by father before birth of the child; alcohol abuse by mother; wrong ideas about the effects of alcohol. Under the influence of these and similar examples of behavior, alcohol abuse develops already within 10-11 years after starting to consume alcoholic beverages frequently and regularly, and some of the individuals who overdrink become stricken with the disease of chronic alcoholism. Alcoholism is not only a

personal disaster for the patients, but its consequence is disintegration of the family. This is a social evil. And it consists not only of the fact that there is a considerable number of such sick people, but an even greater number of those who drink to excess, who develop into chronic alcoholics. The latter, because of their sometimes antisocial behavior (hooliganism, brawls, tardiness or absence from work, etc.) and higher morbidity, mortality and disability, cause much harm to the family, their work group, society, reduce manpower resources and thereby squander ["plunder"] public assets.

As we have mentioned, analogous factors are instrumental in development of a persistent smoking habit--nicotine addiction. This has been clearly demonstrated in special studies. For example, in the candidatorial dissertation of E. V. Malaya, dealing with sociomedical aspects of nicotine addiction in students (1980), it was noted that the smoking by individuals in the immediate environment (parents, friends, instructors, etc.), false idea of prestige in smoking, need for socialization and other predominantly behavioral factors are instrumental in starting and acquiring the habit to smoke. For the time being, there are few studies on this subject. However, physicians, sociologists and psychologists have proven the devastating effect of nicotine addiction: smokers have a higher incidence of malignant tumors of respiratory organs, cardiovascular disorders including ischemiic disease and myocardial infarction, cerebrovascular disease. Recently, the WHO published the results of many years of research on nicotine addiction, which were conducted in several countries. They confirmed the deleterious effect of smoking on health and behavior, and revealed some new, rather alarming facts indicative of the devastating effects of smoking on health. It is not by chance that the World Health Assembly (1981) adopted a special resolution appealing for effective steps to restrict smoking, to ban it, reduce production and sale of tobacco.

We have cited only a small number of examples of the effects of some aspects of life-style on public health. But even they are indicative of the first and foremost significance of this problem, which requires intensive investigation, explanation to medical figures and the public in order to develop and implement effective measures to safeguard and improve individual and public health, and primarily to prevent diseases.

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PARTY'S AGRARIAN POLICY AND RURAL PUBLIC HEALTH SERVICE TASKS

Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian No 9, Sep 82 (manuscript received 3 Jun 82) pp 3-9

[Article by N. T. Trubilin, RSFSR Deputy Minister of Health]

[Text] The 60th anniversary of the formation of the USSR is a noteworthy event in the life of the Soviet people, evidence of the triumph of the Leninist national policy of the CPSU, of the historic achievements of socialism.

In these years, there was a radical change in socioeconomic living, working conditions and life style of the Soviet people, and there was a rise in indicators of public well-being and culture.

A broad program of socioeconomic measures was approved by the 26th Party Congress. Its main objective is to better meet the material and cultural needs of the working people, to provide beneficial conditions for comprehensive development of Soviet people.

Steps were outlined for continued improvement of socialist health care, its efficacy and quality of medical care.

The RSFSR Ministry of Health, councils of ministers of autonomous republics, krayispolkoms, oblispolkoms, ministries and agencies, as well as public health agencies and institutions of this republic, have effected a set of measures to upgrade health care, provide beneficial working, living, recreational conditions and medical care of the working people, as they implemented the historical decisions of the 26th CPSU Congress, principles of comrade L. I. Brezhnev, general secretary of the CPSU Central Committee and decree of the CPSU Central Committee and USSR Council of Ministers, "On Measures for Further Improvement of Public Health Care."

New tasks are being put to public health workers in connection with the decisions of the May (1982) plenum of the CPSU Central Committee. The Food Program approved by this Plenum provides for improvement of social living conditions and life style, systematic implementation of measures to further improve well-being, culture, medical care for rural inhabitants. The development of agroindustrial complexes cannot fail to affect medical care for the rural population with regard to both organization and its level and quality. This extremely important task must be performed in a complex [combined] manner with involvement of the community and representatives of medical science.

A good material and technical base for public health care has been provided in the Russian Federation. More than 3.5 million people are employed in the area of health care, including more than 500,000 physicians (41.4 physicians per 10,000 population), 1.6 million paramedical personnel (115.5/10,000). More than 1,800,000 beds have been deployed (130.8/10,000) in 12,000 hospitals. Over 4 million urban and rural residents seek medical care, consultations and preventive physicals daily in visits to physicians at therapeutic and preventive institutions (12.4 visits per urban resident and 5.2 visits per rural resident). Hospital facilities admit 34.2 million people.

Improvement of socioeconomic living conditions of the Soviet people, the advances in health care, strengthening and expansion of the material and technical base have had a beneficial effect on public health. Diphtheria, poliomyelitis and malaria are now recorded in isolated cases. In the last few years there has been a decline (by 3-4% per year) in morbidity involving temporary disability, primary retirement due to disability is decreasing and there is increase in number of elderly individuals.

Approximation of material, cultural conditions and life-style in urban and rural areas on the basis of accelerated advancement of agriculture has always been and is still the subject of particular attention of the Party and government. Industrialization of agriculture, broad use of machinery and equipment are causing agricultural labor to come increasingly closer to industrial labor. With implementation of the Food Program, favorable conditions are being created for this. Under the 10th Five-Year Plan, in the Nonchernozem Zone of the RSFSR alone more than 170,000 families have migrated from small, unpromising villages. Successful organization of rural settlement could be even better because of development of agroindustrial complexes.

Construction of large agricultural enterprises laid the foundation for development of new villages with a high level of cultural and domestic services for the inhabitants. Major work is being done on renovation and improvement of existing towns and villages. Under the 10th Five-Year Plan alone, the RSFSR allocated 11.2 billion rubles of state capital investments and kolkhoz funds for construction of housing in agricultural regions. At the present time, there is an average of 13.2 square meters living space per rural inhabitant, which is the same as for urban inhabitants.

These and other social changes in rural areas became a firm basis for implementing the Party's program for further development of rural health care.

In the light of the decree of the CPSU Central Committee and USSR Council of Ministers "On Measures for Further Improvement of Public Health Care," considerable work has been done in this republic to safeguard the health of agricultural workers, prevent diseases and increase their work activities.

The councils of ministers of ASSR's, krayispolkoms and oblispolkoms, as well as the Ministry of Health, have done much to develop and strengthen the material base of therapeutic and preventive institutions that service the rural population. Under the years of the 9th and 10th five-year plans alone, 397 million rubles were allocated for construction of rural health care institutions. Rural hospitals have been constructed with a total of 55,000 beds and outpatient-polyclinic institutions that can handle 70,000 visits per shift.

Much organizational work dealing with fulfillment of assignments to build medical institutions in rural areas has been done in Bashkir, Mordovian, Komi, Udmurt ASSR, Stavropol Kray, Arkhangelsk, Voronezh, Saratov, Rostov and other oblasts.

At the present time, there is a wide network of medical institutions that renders therapeutic and preventive services to agricultural workers: 69 republic (ASSR), regional [kray] oblast hospitals, 2113 central and numbered rayon hospitals, 4639 rural district hospitals, 1321 medical walk-in and 48,418 feldsher-obstetric facilities. Rural residents also receive specialized medical care in urban health care institutions.

The role of oblast hospitals has grown significantly as centers for highly qualified, specialized medical care, organizational and methodological guidance of rural medical isntitutions, bases for training and advanced training of medical personnel.

Under the years of the 9th and 10th five-year plans, much work was done to strengthen their material and technical base. A total of 14 large hospital complexes were built and started up, including facilities with 1700 beds in Novosibirsk, with 1500 beds in Gorkiy, 1000-bed hospitals in Tula, Sverdlovsk, Kalinin, Rostov-on-Don, Voronezh, Omsk and a number of other cities. More than 50 medical buildings have been erected to enlarge existing hospitals. Under the 11th Five-Year Plan, construction will be completed and started of 16 major multispecialty hospitals (in Bashkir, Udmurt, Tatar ASSR, Krasnodarsk, Khabarovsk Krays, Leningrad, Kuybyshev, Chita and other oblasts). Even now, 27 out of 69 oblast hospitals have over 1000 beds. Their average size increased from 824 to 904 beds during the years of the 10th Five-Year Plan alone.

Hospitals are better supplied with medical diagnostic equipment; organization of the therapeutic process has improved; wiser use is being made of the labor of physicians and paramedical personnel.

The construction of new multispecialty hospitals and enlargement of existing ones has made it possible to expand significantly specialized forms of medical care for the rural population. A total of 29 republic-level, 110 inter-oblast and over 800 oblast specialized centers have been deployed in facilities of of oblast, kray and republic hospitals. In most of these hospitals, qualified medical care is being rendered in 27-30 specialties, and 40-50 specialties are covered in consultant polyclinics.

Much work is being done locally to strengthen the material base and improve the performance of central rayon hospitals (CRH), which render qualified medical services to the public and manage all public health institutions in the rayon. In the years of the 10th Five-Year Plan and in 1981, CRH and separate buildings for them have been constructed with a capacity of 50,900 beds, as well as polyclinics handling 101,700 visits per shift. The mean capability of these institutions increased to 263 beds with an urban center and 152 with a rural center. Of the total number of rural residents, 45.8% receive hospital care at CRH's.

A total of 623 interrayon specialized departments have been organized to provide specialized medical care.

A particularly large amount of work to develop and strengthen the material base of CRB was done in Bashkir, Mordovian and Udmurt ASSR, Krasnodarsk, Stavropol Krays, and elsewhere.

Rural district hospitals render a significant amount of medical services. About 30% of the rural population, in relation to the total number hospitalized annually, are treated there.

Strengthening the material and technical base of health care made it possible to raise in 1981 availability of hospital beds to the rural population to 132 per 10,000 population, counting the use of city hospitals.

With each year, the scope and quality of outpatient-polyclinic care of the rural population are improving. The number of visits to physicians per rural resident increased from 4.2 to 5.0 during the years of the 10th Five-Year Plan.

Self-contained rural medical offices [for ambulatory care] are acquiring increasing significance in bringing medical care closer to the rural population. Their number increased by 34.8% in this republic in the last 6 years.

There has been extensive development, particularly during the period of mass scale agricultural work, of mobile medical offices, clinical diagnostic laboratories, fluorography units and stomatology offices. They perform a large volume of preventive and therapeutic work.

There has been further development of rural emergency medicine. It is practiced by CRH stations and hospitals, the number of which has increased by 32.9% during the years of the 10th Five-Year Plan, whereas the number of responses related to accidents, diseases and parturition has increased by 46.2%.

Branches of emergency care departments are being established at major district and numbered rayon hospitals in order to improve the quality of emergency medical care in rayons and bring it closer to the rural population. This service has been best organized in Chuvash ASSR, Leningrad, Kuybyshev and other oblasts.

As a result of the measures that were instituted, there has been a reduction in time spent to deliver patients to a hospital due to appendicitis, peptic ulcers and strangulated hernia. Postoperative mortality has dropped.

The forms and methods of work at therapeutic and preventive institutions are constantly improving. For example, at the Kemerovo Oblast Hospital, which has 1200 beds (chief physician V. A. Raykh), 27 specialized departments have been deployed: cardiac surgery, abdominal surgery, urology, nephrology, gastroenterology, hematology, vascular surgery and others. Interoblast centers were opened: for restoration of hearing, kidney transplantation, pediatric surgery. Specialized medical care of children is expanding. A total of 23 functional diagnostic and therapeutic offices and laboratories have been opened, including an artificial kidney laboratory, immunological, for extracorporeal circulation, processing of tissues and cadaver blood, genetics and others. Patients are being seen in 48 specialties at a consultant polyclinic.

Work is being done in close contact with the Kemerovo Medical Institute, Novokuznetsk Institute for Advanced Training of Physicians, Kuznetsk Basin Scientific Research Institute of Traumatology and Rehabilitation, Institute of Combined Problems of Hygiene and Occupational Diseases of the Siberian Department of the USSR Academy of Medical Sciences. Successful use is being made of the latest advances in medical science. This means that the public is receiving locally all forms of the most modern, highly qualified medical care in Kemerovo Oblast. There is no need here to send, even the most problematic patients, to Moscow, Leningrad or other cities in central Russia.

The centers of specialized care, which are being established at multispecialty hospitals, primarily oblast hospitals, are undergoing further development. Such centers are operating in Voronezh, Gorkiy, Kemerovo, Orel and Rostov Oblast hospitals, the Krasnodar Kray Hospital and others. For example, there are seven such centers at the Orel Oblast Hospital (chief physician P. A. Yakovlev): orthopedic-traumatological, gastroenterological, endocrinological and others. These centers have medical and diagnostic offices in common and borderline patients are managed by allied specialists. This permits comprehensive work-ups and treatment of patients, more efficient use of medical equipment and personnel, as well as organization of the therapeutic and diagnostic process on a high level.

Several oblast hospitals have equipped the specialized centers with equipment for remote diagnosis of acute diseases of the abdominal cavity, ischemic heart disease, cerebrocranial trauma, etc. Input of information by radio, telephone and teletype is instrumental in early detection of diseases; it assures immediate consultations by experienced specialists and renders it realistic to utilize instrumentation methods on a wide scale for implementation of mass scale preventive physicals.

For example, the Moscow Oblast Clinical Scientific Research Institute imeni M. F. Vladimirskiy--MONIKI (director Prof A. M. Sozonov, Honored Scientist of the RSFSR) receives EKG's by telephone from 98 locations in Moscow Oblast. In addition, transmission consoles have been installed at four CRH's of this oblast for reception and interpretation of EKG's from 10 institutions in outlying regions. The knowhow of Moscow Oblast in use of remote electrocardiography [telecardiography] has been given a high rating by the All-Union Cardiological Research Center.

Since 1979, transmission of information about external respiration function and electroencephalography has been practiced in Moscow Oblast, with input in computers and output of computer conclusions.

The Bashkir Republic Hospital imeni Kuvatov receives via telephone and interprets EKG's from 19 regions around the clock. Such work is also being done well by the Volgograd, Saratov, Orel, Leningrad, Voronezh Oblast, Khabarovsk, Maritime Kray hospitals and others.

Automation of diagnostic processes is a promising direction. It really brings highly qualified care closer to the residents of remote areas, and in the very near future must be adopted in all oblasts of the RSFSR.

The department of urology (headed by Academician N. A. Lopatkin) of the Second Moscow Medical Institute and Scientific Research Institute of Eye Microsurgery (director S. N. Fedorov, corresponding member of the USSR Academy of Sciences) were the originators of the brigade form of work in specialized centers. In essence the method consists of organizing care of patients referred to the center by the same team of physicians at all stages: consultation, prehospital examination, preoperative preparation of patients and administration of all therapeutic and health-improving measures. This practice was approved by the board of the RSFSR Ministry of Health and is presently followed in many institutions. The advantage of this form of work is evident from the exmaple of Rostov Oblast Clinical Hospital, where the brigade method was adopted in the ophthalmology department, centers of abdominal pathology, neurology, pulmonology and others. The efficacy of this method is confirmed by indicators such as the following: patient work-up time was reduced from 5 to 2.3 days; time spent per patient per bed decreased by 2.2 days and surgical activity increased from 46.1 to 60.7%. This made it possible to hospitalize an additional 17.6% of the sick in specialized centers. The economic effect of the work of each brigade constitutes about 30,000 rubles/year.

Improved health care of women and children in rural areas is largely instrumental in solving problems put by the Party and government in the area of raising a healthy generation, preserving and increasing rural manpower resources.

In the RSFSR, 45.5% of the women (in relation to total number of employed women) are engaged in agriculture. To render outpatient care, 1896 women's consultation centers, 26,000 obstetric and gynecological beds, 1282 maternity beds have been deployed at feldsher-obstetric centers and kolkhoz maternity homes. Their material and technical base has been strengthened. There are obstetrical departments, which play a large part in improving the quality of obstetric and gynecological care of rural women, at 41 oblast hospitals. All this has resulted in upgrading obstetric and gynecological care of women in rural areas. There has been a decline in gynecological morbidity involving temporary disability. Mortality among mothers has dropped, and there have been no maternal deaths in 35 administrative regions in the last few years.

Medical care of children is improving. In the years of the 10th Five-Year Plan, there was considerable strengthening of the base of medical institutions that render medical and preventive care to rural children. In these years, the pediatric oblast (kray, republic) hospitals, which are highly qualified, both medical-consultation and organizational-methodological centers, have grown by almost 3000 beds. Large general pediatric oblast hospitals have been erected in Vladimir, Penza, Sverdlovsk, Kalinin, Tambov, Perm Oblasts, as well as Tatar and Komi ASSR. As of now, the total bed resources for rural children constitute 34,982 beds, more than 10% of which are specialized. There will be further development of a form of service such as visiting pediatric consultation.

The upgrading of therapeutic services and introduction of intensive care methods have resulted in a decline of hospital mortality among children due to pneumonia. Child mortality continues to decline in rural areas. Its level is particularly low in Mordovian ASSR, Belgorod, Orel, Penza, Murmansk, Moscow, Tomsk and other oblasts.

Medical care of children in organized groups is being refined; there is improved personnel back-up in children's institutions, as well as sanitary and hygienic conditions; problems of diet, physical education and summer vacations for children are being solved in a more combined manner, together with public education and agricultural agencies.

Specialized care for rural children is also expanding. They receive such care in specialized pediatric departments of oblast (kray, republic) hospitals and oblast consultant polyclinics in 10-15 specialties.

At the present time, in connection with development and concentration of agricultural production, in particular, the livestock industry, development of large livestock complexes, the problem of safeguarding the health of animal breeders is acquiring exceptional urgency.

The specifics of their labor makes it imperative to bring medical care as close as possible to the work base, and the nature of preventive and ameliorative measures provides for essential use of physical factors.

Some experience has been gained in operating kolkhoz and sovkhoz preventoriums in Altay Kray, Rostov, Kurgan, Kuybyshev and Omsk Oblasts, as well as Mari ASSR.

The health-improving measures implemented by preventorium workers, in accordance with instructions of physicians of CRH's, district hospitals and outpatient facilities are having a beneficial effect on the occupational morbidity rate among livestock breeders, they have lowered morbidity involving temporary disability and occupational traumatism.

Serious attention has been given to training physicians and paramedical personnel and using them to man rural therapeutic and preventive institutions.

During the years of the 10th Five-Year Plan, 34,000 physicians were assigned to public health institutions servicing rural workers, including 13,465 for the Nonchernozem Zone. In 1981, 7000 physicians were directed there. In 1982, it is planned to assign 7230 young specialists in these regions. At the present time, more than 30,000 physicians are working in rural areas. Their number has grown by almost 20.0%, as compared to 1975.

Some work has been done in this republic to improve the drug supply to rural patients. The material and technical base of pharmacy institutions, particularly central rayon pharmacies, is being strengthened. They are now better equipped with pharmaceutical furnishings, technological equipment, instruments and mechanization devices. Construction of pharmaceutical warehouses and storage areas is being completed, and there are plans for new building in several oblasts.

Visits are organized to field camps and places where mass-scale farm work is being done to deliver drugs and dressing materials; the operating hours of rural pharmacies have been revised, and they are now open at times that are convenient for rural workers. Pharmaceutical centers have acquired essential importance in supplying medication to the rural population. In 1976-1981, the assortment of medical merchandise at pharmacy centers and goods turnover have increased.

There are 6890 pharmacy centers that provide free and preferential drug supplies for some categories of patients, including disabled veterans of the Great Patriotic War living in rural areas. As a result of the work that has been done, there has been an increase in sales of medical merchandise per rural resident.

Under present conditions of scientific and technological progress, problems of environmental protection, better sanitary inspection by the state and more efficient operation of the sanitary and epidemiological service of the RSFSR are acquiring great importance to rural areas. In the last period, considerable work has been done in rural RSFSR to develop a network of sanitary and epidemiological stations, train specialists for them and strengthen their material and technical base. The workers in the RSFSR sanitary and epidemiological service are participating actively in solving problems of placement of agricultural complexes, urban planning and development. Checking the implementation of measures to improve working conditions of machine operators, livestock breeders, field workers and other agricultural workers, as well as proper use of mineral fertilizers and toxic chemicals has been expanded and has become more effective. Sanitary supervision has improved with reference to water and sewer systems, as well as amenities in populated areas. The steps that are being implemented to assure sanitary and epidemiological well-being of the rural population have resulted in a significant decline in number of cases of acute and chronic poisoning by toxic chemicals. Considerable strides have been made in the control of infectious diseases.

At the same time, there are still difficulties and unsolved problems in the area of organizing medical and health care for the rural population. Under the 11th Five-Year Plan, measures will be carried out to upgrade the forms and quality of medical care of the rural population, further development and strengthening of CRH, expansion of outpatient-polyclinic care and improvement of their operation, primarily in the preventive area that is aimed at lowering morbidity, disability and mortality. Special attention will be devoted to expanding specialized care for women and children.

Sixty years separate us from the days when, by the will of the peoples of our country, the Union of Soviet Socialist Republics was founded, the world's first unified, allied, multinational state of workers and peasants.

On its 60th anniversary, our country has arrived at the flowering of manforces, major achievements in all areas of the national economy, science and culture. Inspired by the decisions of the 26th CPSU Congress, our people are working with success on fulfillment of the plan for economic and socialist development of the USSR in 1981-1985. The physicians of the Russian Federation are full of determination to perform the tasks confronting them for the further upgrading of medical and health care of the rural population, to bring closer together the standards of medical care for the urban and rural population.

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ECONOMIC ASPECTS OF UPGRADING OPERATION OF OUTPATIENT-POLYCLINIC INSTITUTIONS

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[Article by M. P. Roytman, V. N. Shcherbakov and T. P. Blinova, All-Union Scientific Research Institute of Social Hygiene and Public Health Organization imeni N. A. Semashko, USSR Ministry of Health, Moscow]

[Text] The USSR Ministry of Health has called for a set of measures to provide for considerable upgrading of outpatient-polyclinic care of the public (1981). Public health agencies must perform work on preparation of plans for future development of the network and improvement of performance of outpatient-polyclinic institutions. The economic aspects of polyclinic operation are very important to implementation of these tasks.

The staff of our institute conducted a study at 145 territorial polyclinics in Moscow for adults and 95 polyclinics for children, including comprehensive estimates from the data referable to 23 polyclinics in 2 districts [rayons] of the city.

Sufficient reliability of results was assured by the large number of institutions used in the processing. Thus, construction of variation series and determination of means revealed that the average outlay per overall visit (to polyclinic and in the home) constitutes 1.22±0.02 rubles (σ = 0.25) for adults. Mean outlay in pediatric polyclinics is 1.26 rubles, with the same margin of error and the same standard deviation.

The greater the capability of an institution, the lower the expenses for the work volume according to number of visits: in relatively small polyclinics for adults, with a staff of up to 60 physicians, the cost per visit was an average of 1.25 rubles; in larger ones with 101-120 or more physicians, it is lower and constitutes 1.17 rubles (r = -0.98±0.017). In pediatric polyclinics staffed by up to 40 physicians, the cost per visit is 1.28 rubles, whereas in those with a staff of 61 or more it is 1.21 rubles (r = -0.95±0.055).

Analysis of expenditures for polyclinics differing in capability scaled to one physician post revealed the same pattern: the larger the polyclinic, the lower this outlay (r = -0.90±0.094 for adult polyclinics and r = -0.99±0.001 for pediatric polyclinics).

However, calculation of polyclinic expenses per resident revealed that there is a strong relationship between expenses and polyclinic size (r = +0.90± 0.097 and r = +0.79±0.021). Consequently, expenses per resident increase with increase in polyclinic capability, in spite of the decrease in cost per visit. This is attributable to the increased number of visits per person in the larger polyclinics (from 6.8 visits per adult in relatively small polyclinics to 8.7 visits in large polyclinics, and from 17.8 visits per child in small polyclinics to 20.7 visits in large pediatric polyclinics). A strong relationship was also demonstrated (r = +0.92±0.81 and r = +0.85±0.081).

The expenses per adult constituted 9.2 rubles per year and per child 22.7 rubles. The difference between these costs with virtually equal cost per visit is attributable to differences in frequency of visits to polyclinics by adults and children.

Thus, in larger polyclinics the monetary cost for the work volume performed and per physician's post held was lower, but expenses per resident were higher, since a larger volume of care is provided in large polyclinics, as measured by the number of visits paid by each resident. This confirms that larger polyclinic institutions are more economical and that they provide a relatively larger volume of care for the public.

Using data referable to 23 polyclinics (12 for adults and 11 for children), more comprehensive computations were made to determine the expenses per visit to physicians in different specialties separately in the polyclinic and for house calls. We used the method of scaling all visits (polyclinic and house calls) to arbitrary equivalent units in accordance with work time spent by the physicians.

The data on expenditures per polyclinic vist by adults are listed in Table 1.

Table 1. Average cost per adult visit to polyclinic referable to different specialties (rubles)

Medical specialty	In polyclinic	House calls
Internist	0.99	1.72
Internist for adolescents	1.15	--
Cardiorheumatologist	1.30	2.35
Endocrinologist	2.93	4.01
Neuropathologist	0.99	2.35
Infectious disease specialist	1.71	3.28
Surgeon	1.10	4.33
Traumatologist-orthopedist	1.33	4.55
Urologist	1.07	2.74
Gynecologist	1.14	3.10
Ophthalmologist	0.98	3.64
Otorhinolaryngologist	0.98	3.55
Stomatologist	1.39	--
Means	1.14	1.89

Table 2. Cost per visit to pediatric polyclinics as related to different specialists

Specialty	In polyclinic	House calls
Pediatrician	0.93	2.15
Cardiorheumatologist	0.98	1.95
Endocrinologist	1.05	2.83
Psychoneurologist	1.11	2.91
Surgeon	1.23	5.30
Traumatologist	1.51	5.90
Stomatologist	1.13	--
Ophthalmologist	1.06	3.98
Otolaryngologist	0.88	3.27
Nephrologist	1.19	3.34
Means	1.00	2.22

The existence of some specialized offices in polyclinics, which duplicate those in analogous dispensaries is not expedient. This was also reported in previous studies. For example, in 2 (out of 12) polyclinics for adults there are oncology offices. The cost per visit to an oncologist there is 2.5 times higher than to an internist (2.5 rubles) and a house call is 5.46 rubles. Such a high cost is attributable to the small work load for polyclinic oncologists. The actual number of visits per year to these specialists is 2.2 times less than the work load such physicians should handle. With a normal work load for outpatient visits and the scope of work consistent with the physician's employment function, the cost per visit to an oncologist at the polyclinic would be only 1.14 rubles, i.e., it would be substantially closer to the same parameter for other medical specialists. This is also the cause of the high cost of visits to endocrinologists (2.93 rubles at the polyclinic and 4.01 for house calls). Here too, the annual work load is half the employment function of a physician's position.

For most specialties, the expenses per visit to the adult polyclinic are in the range of 0.98-1.14 rubles. The average cost per visit (including offices represented only in some polyclinics in isolated cases) is 1.14 rubles at the polyclinic and 1.89 for a house call.

Analogous data on the cost of visits to specialists at 11 pediatric polyclinics are listed in Table 2.

Average overall cost per visit (at polyclinic and home) for 12 polyclinics for adults and 11 for children coincided, constituting 1.05 rubles. This figure for the 23 base polyclinics does not deviate appreciably from the average cost per vist in all the rest of the Moscow polyclinics: 1.22 rubles in polyclinics for adults and 1.26 in those for children.

There are interesting data on the cost of diagnostic tests and treatments in polyclinics scaled to one examination in an x-ray lab, 1 laboratory analysis, 1 treatment in the physiotherapy department, etc. (Table 3).

Table 3. Cost per test (treatment) at base polyclinics (in rubles)

Type of polyclinic	X-ray	Clinical laboratory	Physio-therapy	Therapeutic physical culture	Functional diagnosis and EKG
For adults	1.47	0.30	0.55	0.81	0.77
For children	2.20	0.29	0.48	1.16	--

The average cost per visit to territorial polyclinic for adults referable to therapeutic and diagnostic services is 32 kopeks (25.6%) and to those for children, 25 kopeks (20%).

Analysis of the types of expenses referable to different items on the budget of 23 base polyclinics confirmed the previously demonstrated patterns: 68-72% for personnel wages and about 4% extra charges referable to wages. In second place in the expense structure is housekeeping (13-16%) [or management?]. Item 10 of the budget, "Acquisition of drugs and dressing materials," is presently the only one that is planned on the basis of set standards. For municipal polyclinics, the expenses for this item are planned on the basis of the standard of 4 kopeks per visit. However, the actual cost for this item in territorial polyclinics for adults differs drastically from the set standard. This is related to the increasing number of individuals for whom drugs are free. When scaled to one visit to a base polyclinic for adults, the cost is 13 kopeks, 7 kopeks of which is referable to free drugs. In pediatric polyclinics, the actual expenses coincide with the established standard of 4 kopeks. On the whole, for all polyclinics in Moscow, the expenses referable to Item 10 per visit constituted 10 kopeks, 50% of which is referable to free drugs for certain groups of patients.

It would probably be expedient to include in the standard for cost of acquiring drugs and dressing materials the expenses for dispensing free drugs.

Our data on the cost of outpatient-polyclinic care are somewhat higher than the figures given in previous studies. There is validity to the rise in cost for the performed volume of work and per physician post. It is attributable primarily to the systemic rise in salaries of medical personnel, and the share of expenses to pay for the work of personnel is high at polyclinics. Moreover, other expenses are also rising, in particular, to purchase drugs, since there is increase in number of groups for whom drugs are free.

We also investigated distribution and efficiency of utilizing the fixed capital at 145 polyclinics for adults and 95 for children in Moscow. With increase in size of the polyclinics, we find positive changes in the structure of their fixed capital: increased share of cost of their active part, i.e., medical equipment for special medical and diagnostic purposes, and decreased share of buildings, installations and transmitting equipment [?] (Table 4).

The increase in share of active part of the fixed capital at major outpatient-polyclinic institutions is attributable to the systematic increase in use in their practical work of more refined equipment, while the decrease in

share of cost of the passive part of the fixed capital is due to wiser use of floor space at the large polyclinics.

Table 4. Structure of fixed capital of territorial polyclinics differing in size

Polyclinic size, determined by number of physician posts	Territorial adult polyclinics			Territorial pediatr.polyclin.		
	medical equipment	other furnishings	buildings, installations, transmit.equip.	medical equipment	other furnishings	buildings, install., transmit.eq.
21-40	--	--	--	10.5	5.2	84.3
41-60	12.4	3.9	83.7	12.1	5.2	82.7
61-80	16.3	4.6	79.1	16.5	5.4	78.1
81-100	18.7	4.4	76.9	--	--	--
Over 100	21.3	5.0	73.7	--	--	--

It is also important to mention that, with increase in polyclinic size, there is an increase in cost of the active part of the fixed capital scaled to 1000 serviced population (strong correlation). This means that there are greater opportunities at large polyclinics to be furnished with medical equipment and furnishings for special medical and diagnostic purposes.

Capital available for polyclinic personnel labor is characterized by the annual mean cost of fixed capital as the average per polyclinic employee. On the average, for the entire group of base polyclinics, this indicator was 2553 rubles.

There is a strong inverse correlation between the size of a polyclinic and available capital for labor. However, at the larger polyclinics, there is more availability of active fixed capital to medical personnel labor. For economic evaluation of equipment available to the work of medical personnel this is a very important indicator, since in its functional purpose, the active part of the fixed capital is used only by medical personnel and it determines the quality of medical care.

Available fixed capital for labor of medical personnel alone (physician and nurse) in the active part of the fixed capital averaged 587.4 rubles for all of the institutions.

In the course of our work, we examined financing of polyclinics referable to Item 12, "Acquisition of equipment and stock," i.e., expenses to replenish worn out medical and housekeeping equipment. The annual standards for wear and tear of fixed capital of institutions and organizations on a state budget, which were approved in 1974, served as the basis for this study.

At the territorial polyclinics for adults and children, the financing standards for acquisition of equipment and stock (to replace wear and tear) should, according to our estimates, constitute 9.5-10% of their cost. The actual expenses, however, for annual replacement of wear and tear constituted only 3.1-3.4% of the cost. In other words, at municipal territorial polyclinics, annual allocations for Item 12 replaces only one-third of the actually worn out equipment (33% at pediatric polyclinics and 35% at polyclinics for adults).

The increase in actual outlay to acquire equipment at municipal territorial polyclinics is of basic importance, since polyclinics are the main element in primary medical care for the public.

Investigation of the extent of use of expensive medical equipment at the polyclinics revealed that there is a reserve for improving efficiency of its operation. For example, there are inadequate load indicators and shift indexes referable to use of the most expensive x-ray equipment. The extent of use of x-ray equipment constituted 45% with a shift index of 1.4 at the polyclinics for the adult public, the figures being 21.0% and 1.6, respectively for pediatric polyclinics. There are also considerable reserves for improving the efficiency of using other diagnostic equipment (physiotherapy, functional diagnostic equipment, etc.).

Analysis of the above data is indicative of a need to define better the standards for financial allocations to polyclinics for the purchase of drugs and dressing materials, with consideration of dispensing free drugs to patients, as well as replacement due to wear and tear of equipment and stock. It is also necessary to study the distribution and use of fixed capital of outpatient-polyclinic institutions, as well as the possibility of making better use of their expensive medical equipment. The quality of outpatient polyclinic care will improve when these problems are solved.

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PHYSICIANS' WORK TIME LOSS AND DISTRACTION FROM MAIN DUTIES (ACCORDING TO DATA FOR THE MONGOLIAN PEOPLE'S REPUBLIC)

Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian No 9, Sep 82 (manuscript received 15 Mar 82) pp 52-56

[Article* by G. Zuunay, graduate student in the Mongolian People's Republic]

[Text] In order to make wise use of physicians, it is important to investigate the factors involved in loss of their work time and distraction from their main duties in the course of the year.

At the present time, all of the days off provided in labor legislation are excluded from the calendar year in scheduling a physician's work year.

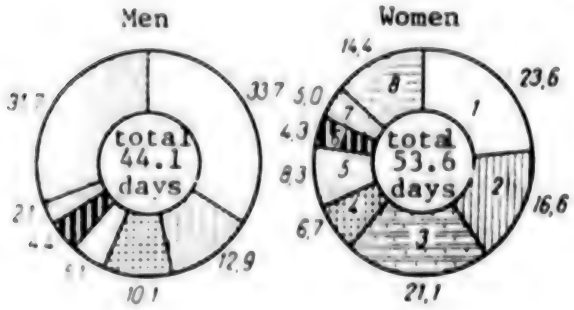
By virtue of different circumstances, a physician is often distracted from his main job, which is related to therapeutic and preventive services to the public. As noted by Soviet authors (I. I. Rozenfel'd, 1961; V. V. Trofimov, 1960; A. K. Khristyukhin, 1965; G. A. Popov, 1966; A. P. Zhuk, 1968; V. M. Zubkov, 1969; Ye. I. Kritskiy, 1970; E. N. Matveyev, 1974), the actual work year of medical workers is shorter than planned.

For example, according to the data of Ye. I. Kritskiy (1970), in the course of the work year, each physician loses an average (considering a 1.25 index of double ["compatibility"?] duty) of 41.8 days at his main work place, which actually corresponds to the absence of 12-15 physicians out of 100 from their work places. According to the data of P. I. Artemov, M. I. Kochemasov, Yu. M. Pistrashko (1962), loss of work time by a district physician is 49 days.

According to the data of A. P. Zhuk, F. M. Ilupinova and V. D. Dubrovina (1964), the number of days a physician does not spend on his main job ranges from 15.6 to 49.9% of the annual work schedule. Analogous figures were obtained by V. K. Ovcharov (1961)--20-30%, I. D. Bogatyrev (1962)--15%, A. K. Khristyukhin (1968)--20%, Z. M. Zubkov (1969)--10%, O. D. Kolybina (1969)--16.7%. According to E. N. Matveyev (1974), the indicator of work time lost for the entire group of paramedical personnel is 5.3%.

*Excerpt from candidatorial dissertation prepared at the All-Union Scientific Research Institute of Social Hygiene and Public Health Organization imeni N. A. Semashko (scientific supervisor--Prof V. S. Luk'yanov).

No special studies had been conducted in MNR [Mongolian People's Republic] of work time lost by medical workers. Our objective was to determine the nature, frequency and magnitude of such loss per year, as well as causes, for physicians differing in sex and age. As the unit of measurement of work time lost, we selected a calendar day, since the number of days that physicians did not come to their main job in the course of the year was calculated without excluding days off. We studied work time lost and distraction from main duties of physicians who had worked for the entire year (1978) in MNR public health agencies and institutions. Our processing included 91.4% of all physicians in MNR. The data were processed on a computer at the Main Computer Center of the USSR Ministry of Health. Analysis revealed that there were 1151 cases per year of failure to show up at the main job per 100 working physicians of all ages, for different reasons, and the number of days lost was 4980.



Level and structure of work time lost by physicians in course of a year (%)

1) work time lost due to advanced training
2) due to diseases
3) due to pre- and post-partum leave [maternity leave]
4) due to health education work
5) due to leave without pay
6) due to additional leaves granted by law and management
7) due to care of sick family members
8) other causes

Table 1. Work time lost by physicians in course of a year (% of total)

Work time loss	Men	Women	Both sexes
Reimbursable from social security fund	27.2	56.9	46.4
Not reimbursable from social security fund	72.8	43.1	53.6

The Figure graphically illustrates the level and structure of lost work time scaled to one physician. As a rule, there was some reason for failing to come to work. For example, physicians are often called away to conduct health [sanitary] education work. In MNR, this is an important form of medical work, since a physician's personal contact with residents of a given region or district is largely instrumental in improving the efficacy of disease prevention.

Male physicians spend 447 days on health education per 100 working physicians and women physicians spend 350 days on this activity.

Work time losses are not the same for physicians living in different settlements. They are greater for those working in an aymak (region) center--

5832 days, and in the cities of Darkhan and Erdenet--5899 days. Physicians working in Ulan-Bator and somons lose less time (4498 and 4751 days, respectively; average indicator of loss per year--4980 days).

Table 2. Work time losses for physicians of different age and sex as related to causes (in days per 100 employed)

Causes	Age, years														
	to 29			30–39			40–49			50–59			60 & older		
	M	F	Both sexes	M	F	Both	M	F	Both	M	F	Both	M	F	Both
Illness	293	496	443	531	919	797	701	1334	999	645	788	685	133	—	604
Caring for sick child	105	269	226	189	276	249	25	268	139	58	76	63	—	—	—
Caring for other family members	—	13	9	8	33	25	—	—	—	—	—	—	—	—	—
Maternity (pre and postpartum) leave	—	1707	1262	—	1178	807	—	371	175	—	240	68	—	—	—
Sanatorium and resort therapy	50	42	128	128	87	100	118	102	110	98	—	71	160	—	133
Additional leave allowed by law and granted by management	67	230	188	154	229	205	230	227	228	374	190	322	80	—	67
Leave without pay	165	482	400	280	451	397	208	411	303	234	218	230	—	—	—
Disability	91	113	107	152	263	228	132	305	213	444	179	370	1400	—	2000
Civic and social duties	138	56	77	284	66	135	214	189	202	120	79	109	—	—	—
Work in military commissariat	33	4	11	46	7	19	39	19	30	74	—	53	—	—	—
Health education work	548	1299	364	548	423	462	393	299	349	311	321	313	100	667	194
Ideological and political work	9	19	16	36	13	20	12	36	23	16	1	12	—	—	—
Advanced training	1813	1034	1238	2023	1432	1618	1239	1167	1204	618	838	681	147	—	122
Business trips	369	192	238	692	316	434	952	515	746	999	382	825	747	—	622
Others	156	19	55	51	14	26	43	53	48	11	28	16	207	—	172
Totals	3837	4975	4718	5122	5707	5522	4306	5296	4769	4002	3340	3818	3974	667	4004

It is interesting to note that several authors (A. K. Khristyukhin, 1965; A. P. Zhuk, 1968; E. N. Matveyev, 1974) suggested that work time losses be grouped in the following manner: those reimbursed [remunerated] from the social security fund and those that are not reimbursed. These authors suggested that the first group of losses be excluded in estimating the duration of a physician's work year, since the wage fund is not expended and there is an opportunity to invite another physician. Ye. I. Kritskiy (1970) believes that this

suggestion is unwarranted, because more than half of all lost work days are paid for. According to his data, loss of work time by women physicians is referable mainly to the first group and is 13% greater than loss in the second group. Our data are listed in Table 1.

As we see, the share of losses for men in the first group is half the level for women. Interestingly, overall loss is greater by 7.2% in the second group than the first. These data show us how to improve use of physicians' work time during the year. It should be noted that the losses remunerated from the social security fund (related to illness, patient care [family], maternity, sanatorium and resort therapy, disability) cannot be controlled. Loss referable to the second group (advanced training, work in military commissariat, civic and social duties, health education and ideological-political work, business trips, etc.) is easier to control.

It should be noted that male physicians are more often distracted from their main work for all reasons (1256 cases per 100 working men) than female physicians (1081 cases), but the number of lost days is greater for women (5359 versus 4411 per 100 employed physicians). The largest loss of work time is referable to men and women 30-39 years of age, constituting 5124 and 5707 days, respectively per 100 working (Table 2). In one year, each representative of this age group loses an average of 55.2 days. The number of lost days for physicians up to 29 years of age is 4718 per 100 employed, it is 5522 days for the 30-39-year group and 3818 days for those 50-59 years of age (see Table 2).

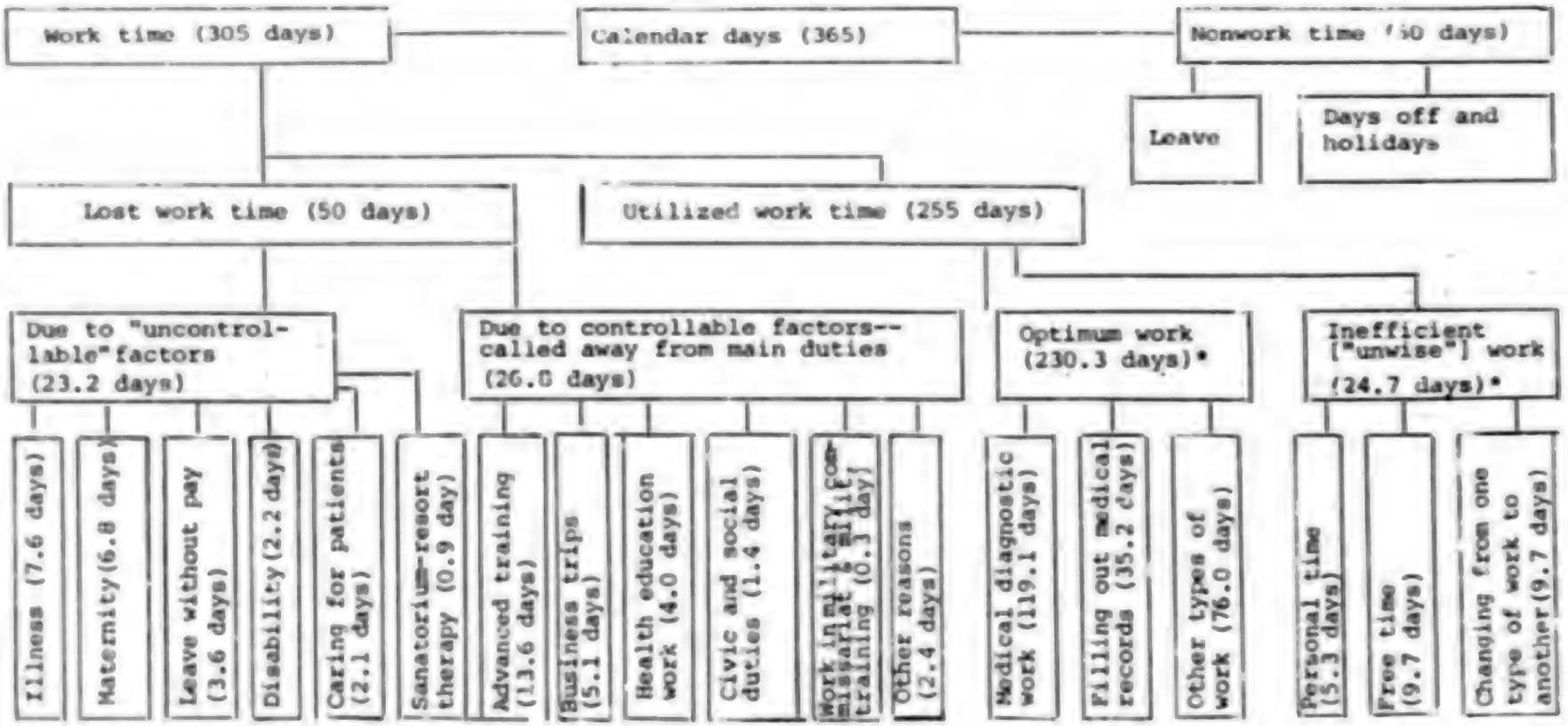
Illness-related loss of work days reached a maximum in the 40-49-year age group, for both men (701 days) and women (1334 days per 100 working). The work time lost that is related to pregnancy and care of sick family members is greatest among young physicians. Women physicians lose almost 3 times more work days than men in connection with caring for sick family members. Work days lost because of leave without pay are high for individuals up to 29 and 30-39 years of age (400 and 397 per 100 working physicians, respectively).

Work time spent on advanced training (specialization, advancement, seminars in special field, conferences and meetings) varies for physicians of different sex and age. It is particularly high for young physicians (up to 29 years old)--1238 days per 100 working individuals, as well as those 30-39 and 40-49 years old (1618 and 1204/100, respectively). Male physicians are more often distracted from their main job for these reasons than women in all age groups, except 50-59 years.

Failure to perform the main work due to business trips caused more loss of work time among male physicians of all age groups than women. For young and middle-aged men, work time lost constituted up to 999 days/100; after the age of 60 years the figure decreases somewhat.

Women physicians who are 30-39 and 40-49 years of age are active in advancing their training, and work time spent on this constitutes 1432 and 1167 days per 100 employed women physicians in the course of a year. Male physicians as a whole, spent 1467 days/100 employed physicians on advanced training and women spend 1213 days for the same purpose. In all, 1335 days are spent on advanced training per year per 100 working physicians of both sexes.

Chart. Working time of MNR physician in days during a calendar year*



*Figures marked with an asterisk were calculated only for somon (rural) physicians (taken from the data of Ts. Mukhar)

Lost work time also depends on the medical specialty. It is greatest for dermatovenereologists, epidemiologists, infectious disease specialists and ophthalmologists.

The Diagram illustrates the distribution of a physician's working time in MNR in the course of a calendar year.

Thus, in the course of a year, the work time lost by physicians and their distraction from their main job for all reasons constitute 4980 days per 100 working physicians, i.e., 13.6% of the calendar year (365 days). This is tantamount to absence from the job of 14 out of 100 physicians in the course of a year. If we consider the shift index, which is 1.12, the number of missed days would be 55.8 days per physician, i.e., there are 15 physician posts out of each 100 that are not used to render medical services to the public.

It should be borne in mind that investigation of loss of working time by physicians is important to the matter of improving use of medical personnel and the entire area of public health organization in MNR; the data on reciprocal losses must be taken into consideration for this purpose. The correctly calculated duration of the physician's work year in days and hours would permit wise planning of medical and preventive work, eradicate excessive and insufficiert work loads. It is imperative to take steps to lower morbidity among physicians, as well as reduce unwisely spent work time. The latter can be achieved by reducing the temporary time loss due to controllable factors (advanced training, business trips, work in military commissariat, various gatherings, etc.).

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SOME CHARACTERISTICS OF FUCOGLYCOPROTEINS IN BURYAT PEOPLE

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RABINOVICH, P. D. and DOMRACHEVA, N. I., Chair of Faculty Therapy, Saratov State Medical Institute; Chair of Hospital Therapy, Chita State Medical Institute

[Abstract] Earlier it was shown that Buryats experience a 3.4 fold lower incidence of peptic ulcer than Russians living under identical conditions. Gastroenterologists relate formation of ulcers to an imbalance between the agressiveness of the gastroduodenal system contents and resistance of tissue; this resistance in turn depends on secretion of mucus, composition of integmentary epithelium and connective tissue exposed during its injury. To a large degree their resistance depends on presence of carbohydrate containing biopolymers, especially fucoglycoproteins (FGP). In the present study determinations were made of the blood groups, of the ability to secrete ABH system antigens (secretory status) and urinary levels of fucose in Buryats and Russians. The results showed that Buryats had blood group A(II) 2.2 times less frequently than Russians, while the O(I) and B(III) groups were found more often (1.3 and 1.7 fold respectively) in that group. Buryats secrete group antigen "A" 1.6 times less frequently than Russians and their urinary levels of fucose was 2.1 times greater. Normally, presence of blood group O(I) and low secretion of FGP into the mucus predispose to development of peptic ulcer. Yet it is not common among Buryats. Evidently the property of FGP is compensated by intensified synthesis of such substances. This is supported by the observation of definite hyperfucosuria among Buryats. References 43: 28 Russian (1 Western), 15 Western.
[128-7813]

UDC 575.91

MEDICAL-GENETIC STUDY OF TURKMENIA POPULATION. PART 2: INVESTIGATION OF GENETIC PATHOLOGY SPREAD IN FIVE RAYONS OF TASHAUZSK OBLAST'

Moscow GENETIKA in Russian Vol 18, No 6, Jun 82
(manuscript received 28 Apr 81) pp 1018-1023

GLUT'ER, Ye. K., REVAZOV, A. A., KRASNOPOL'SKAYA, K. D., TURAYEVA, Sh. M., CHINIO, L. P., INSAROVA, N. G., YEFIMOVA, M. V., BEREZHNOY, A. P. and POBEDIMSKAYA, T. D., Institute of Medical Genetics, USSR Academy of Medical Sciences, Moscow

[Abstract] The study was carried out in Tashauzsk oblast' of Turkmen SSR, specifically in five rayons: Tashauzskiy, Takhtinskiy, Oktyabr'skiy, Kunya-Urgenchskiy and Il'yalinskiy. National composition was found to be mixed, including Turkmen, Uzbeks, Kara-Kalpaks, Koreans, Tatars, Kazakhs and Russians. Cities were excluded from the survey because of their unique medical service. A large number of genetic disorders was discovered (about 30 nosological groups): ocular, neurological and skeletal pathology, xeroderma pigmentosum, albinism, etc. Some of pathological findings were novel to the screeners. The principal group of disorders consisted of autosomal-recessive forms (39 families, 79 patients with a 0.34-1.29 per 1000 incidence), followed by autosomal-dominant form (6 families, 18 patients and about 0.1 per 1000 incidence). X-chromosome myopathy was found only in two families. The role of drift in rare mutant gene dynamics was identified. References 11: 3 Russian, 8 Western (1 by Russian authors).
[199-7813]

DEVELOPMENT OF RADIOBIOLOGY IN THE UKRAINIAN SSR

Moscow RADIOBIOLOGIYA in Russian Vol 22, No 6, Nov-Dec 82 pp 723-726

[Article by E. E. Chebotarev and V. A. Baraboy]

[Text] As early as the first years after the Great October Socialist Revolution, groups conducting radiobiological investigations appeared in the UkSSR. Thus, in 1923, the Experimental Biology Department, headed by A. A. Krontovskiy, was organized at the Kiev Roentgenology Institute. The studies of A. A. Krontovskiy and his school, continued by M. A. Magat, on the effect of X-rays on tissue cultures, on cell and tissue permeability and on the generation process were of great significance for the development of radiobiology as a science; investigations were begun on the physicochemical properties of irradiated tissues, and the advantages of the prolonged irradiation method in the X-ray therapy of malignant neoplasms were demonstrated. In the 1920's, a relationship between radiosensitivity and the processes of tissue differentiation was established at the Biology Laboratory organized under the Odessa Roentgen-Oncology Institute; it was found that tissues that have completed morphogenesis are more resistant to the effect of radiation than are developing tissues (S. A. Nikitin). In a number of studies, attempts were made to trace biochemical shifts in the irradiated organism (A. V. Reprev, S. A. Nikitin and others).

Since 1955, the leading institute for the "Radiobiology" problem in the Ukraine has been the Physiology Institute imeni A. A. Bogomolets of the UkSSR Academy of Sciences and its biophysics sector, headed by Corresponding Member of the UkSSR Academy of Sciences A. A. Gorodetskiy. The processes of excretion from the organism of incorporated radioactive isotopes and the processes of chemical protection from radiation damage were investigated. A number of studies were devoted to questions of dosimetry. The monograph of A. A. Gorodetskiy, O. A. Khomutovskiy, E. Z. Ryabova and T. P. Sivachenko "Vyvedeniye iz organizma nekotorykh radioaktivnykh veshchestv" [Excretion from the Organism of Certain Radioactive Substances] (1959) demonstrated the influence of pharmacological preparations on the processes of excretion of the radioactive isotopes of phosphorous, strontium, calcium and cesium. The monograph of A. A. Gorodetskiy et al., "Protivoluchevyye svoystva arilamidov i arilgidrazidov monotiokarbonovykh kislot" [Antiradiation Properties of Arylamides and Arylhydrazides of Monothiocarboxylic Acids] (1964) presented

the results of the quest for new antiradiation substances. Investigations of the radioprotective effect of the esters and salts of gallic acid were reflected in A. A. Gorodetskiy's and V. A. Baraboy's monograph "Protivoluchevyye svoystva gallatov" [Antiradiation Properties of Gallates] (1963).

Work has gone in four basic directions at the UkSSR Academy of Sciences Physiology Institute imeni A. A. Bogomolets: 1) study of the biophysical, biochemical and physiologic-morphological processes developing in the irradiated organism; 2) comparative study of the action on the organism of external and internal irradiation, X-radiation, γ-radiation and neutrons; 3) development of chemical and biochemical methods for protecting animals from the effect of ionizing radiations and incorporated radioactive substances; and 4) development of the theoretical bases for tissue dosimetry.

Early changes in the electrical activity of the brain after irradiation (A. I. Danilenko and N. D. Stetsenko) and biochemical shifts in brain tissues (V. P. Komissarenko et al.) were demonstrated. An appreciable rise in the activity of urine DNAse at comparatively small irradiation doses was demonstrated at early periods after radiation exposure (N. I. Kerova). Professor E. E. Chebotarev was involved in the development of methods for treating acute radiation sickness. The results of his investigations were published in the monograph "Kompleksnoye lecheniye ostroy luchevoy bolezni" [Complex Treatment of Acute Radiation Sickness] (1965). Professor L. B. Pinchuk, at the Kiev Hematology and Blood Transfusion Institute of the UkSSR Ministry of Health, developed a new, effective treatment complex, in 1978-1980. She was awarded the UkSSR State Prize for these investigations.

The wide use of ionizing radiations in various branches of science and practice has stimulated the development of radiobiology in the Ukraine. In 1962 a Scientific Council was created on the "Radiology" problem in the UkSSR Academy of Science, the composition of which included leading Ukrainian radiobiologists. During the early 1960's with the creation of the VVR-M type nuclear reactor under the UkSSR Academy of Sciences Physics Institute, the problem of the biological effect of fast neutrons came under study at the Physiology Institute imeni A. A. Bogomolets under the supervision of A. A. Gorodetskiy. The Radiation Protection Laboratory (at the present time, the Radiobiology Department, Institute of Problems in Oncology imeni R. E. Kavetskiy, UkSSR Academy of Sciences), the Radiation Microbiology Laboratory of the UkSSR Academy of Sciences Microbiology and Virology Institute and the Tissue Dosimetry Laboratory of the UkSSR Ministry of Health Roentgen-Radiology and Oncology Institute were organized in 1961. One of the horizontal channels of the reactor, modified for irradiating laboratory animals with fast neutrons, was assigned for the use of these laboratories.

The newly-organized laboratories were primarily involved in developing questions relating to the techniques for irradiating animals with fast neutrons and, also, relating to the measurement of tissue doses in mixed fluxes of γ-neutron radiation (B. R. Kirichinskiy et al.). The distribution of absorbed doses in tissue-equivalent phantoms during total and local animal irradiation was also studied.

In investigations of the relative biological effectiveness (RBE) of fast neutrons (A. A. Gorodetskiy, E. E. Chebotarev and B. R. Kirichinskiy), it was shown that the RBE changes within wide limits depending upon such factors as the power of the irradiation dose, the animal species, the test for estimating radiation injury, the irradiation time and observation time, the mangitude of the γ-background and the orientation of the animal in the irradiating beam. The peculiarity of the response of the hematopoietic and cardiovascular systems of the animal to neutron irradiation is manifested in the slower course of recovery processes, the more pronounced decline in erythrocyte stability and the appreciable rise in the quantity of methemoglobin. Questions related to the influence of ionizing radiations on the structure and functional properties of hemoglobin were analyzed in the monograph of N. F. Starodub, G. M. Rekun and I. M. Shur'yan "Radiatsionnoye porazheniye gemoglobina" [Hemoglobin Radiation Damage] (1976).

I. F. Kovalev (Odessa Eye Diseases Institute imeni V. P. Filatov), in the monograph "Funktsional'nyye mekhanizmy razvitiya radiobiologicheskogo effecta" [Functional Mechanisms of Development of the Radiobiological Effect] (1969), presented an original interpretation of his own and published data on the pathogenesis of radiation damage. The important regulatory role of natural DNAse inhibitors in DNA metabolism was established; a method was developed for extracting and purifying a natural DNAse-I inhibitor from rat spleen, and its properties were studied (E. Z. Ryabova and N. I. Kerova).

The second direction of studies was the development of methods for protection from and treatment of radiation injuries caused by fast neutrons. It was shown that a number of the protective measures effective during X-irradiation are not effective during irradiation with fast neutrons. In the monograph of E. E. Chebotarev, E. Z. Ryabova and V. M. Indyk "Zashchitnoye i lechebnoye deystviye ekzogennoy DNK pri obluchenii bystrymi neytronami" [Protective and Therapeutic Action of Exogenous DNA during Fast-Neutron Irradiation] (1974), it was shown that the protective and therapeutic action of DNA depends not upon the degree of polymerization and isology of the preparations, but upon the dose of the substance and the times of its administration.

The third direction of studies conducted at the reactor of the UkSSR Academy of Sciences Physics Institute was study of the early and remote consequences of a one-time irradiation of animals with fast neutrons; the high blastomogenic action of fast neutrons was demonstrated. The results of the long-term investigations of Ukrainian radiobiologists on the problem of the biological effect of neutron irradiation were summarized in the collective monograph "Neytrony i organizmy" [Neutrons and Organisms] (1982), edited by E. E. Chebotarev. On the basis of the measurement of the extra-weak luminescences of blood serum, a method was developed for the diagnosis and the prognosis of outcome of radiation sickness (Ya. I. Serkiz).

The action of ionizing radiations on plant objects has been studied since 1954 at the Biophysics and Radiobiology Department of the UkSSR Academy of Sciences Plant Physiology Institute. The results of the investigations conducted were published in the monographs: "Estestvennaya radioaktivnost'

rasteniy i pochvy" [Natural Radioactivity of Plants and Soil] (1965) by D. M. Grodzinskiy, "Zashchita rasteniy ot luchevogo porazheniya" [Protection of Plants From Radiation Injury] (1973) by D. M. Grodzinskiy and I. N. Gudkov and "Mekhanizmy radioustoychivosti rasteniy" [Mechanisms of Plant Radiation Resistance] (1976) and "Formy postradiatsionnogo vosstanovleniya rasteniy" [Forms of Postradiation Recovery in Plants] (1980) by D. M. Grodzinskiy et al. The authors examined the basic processes of the protection and postradiational recovery of plants during radiation damage. An antiradiation effect can consist in a reduction of radiation yields of macromolecular injuries due to a direct interaction of radioprotectors with the injurious substances, or this effect is due to a change in the conformation of supramolecular cellular formations, which may be accompanied by a decline in the quantity of molecular injuries. The role of apical dominance in the radiation resistance of plants was established, the significance of the quiescent center of meristems in postradiation recovery was estimated and the protective role of heavy metals in antiradiation protection was demonstrated. Techniques are being developed for influencing the activity of reparative systems in the plant cell and the interactions of cells in the meristem with the aim of managing the processes of populational recovery. Studies in the field of directed mutagenesis with the simultaneous utilization of radiation and protectors, and studies on overcoming the tissue incompatibility of grafts and rootstocks, have been successfully conducted.

Questions of the variability of bacteria under the action of fast neutrons (A. M. Pasechnik) are studied at the UkSSR Academy of Sciences Microbiology Institute. New strains of the microorganisms utilized in production have been obtained.

Investigation of the radiobiological bases of tumor radiation therapy are conducted at the Kiev Roentgen-Radiology and Oncology Institute. A scheme has been developed for the therapeutic use of oxygen and a vitamin complex with the aim of improving the condition of patients during radiation therapy and, in the final analysis, improving the outcome of therapy. The results of these investigations were clarified in Professor L. A. Baran's monograph "Kislorod i vitaminy v onkologicheskoy praktike" [Oxygen and Vitamins in Oncologic Practice]. The results of a study of the toxicity, antiradiational effectiveness and mechanism of action of these preparations were reflected in V. A. Baraboy's monograph "Biologicheskoye deystviye rastitel'nykh fenol'nykh soedineniy" [Biological Action of Plant Phenolic Compounds] (1976). Schemes for tumor radiation therapy were optimized on the basis of an experimental study of the cell cycles in tumors and the utilization of a combination of radiation therapy with cold treatment. A comprehensive experimental study made it possible to demonstrate and approve optimum schemes for a combined cryoradiation therapy of tumors (L. P. Kindzel'skiy).

Radiation therapy is accompanied by a pronounced effect on the normal tissues surrounding the tumor, primarily the skin and mucouc membranes. New methods developed at the Kiev Roentgen-Radiology and Oncology Scientific Research Institute for the prophylaxis of radiation responses using a course of ultraviolet irradiations of an intact portion of the skin, immunoprophylaxis with BCG vaccine and autohemotransfusion and methods for radiation-response

therapy using ethonium and phenolic preparations of propolis have resulted in a reduction of the severity of radiation injuries of the skin and mucous membranes and a 2- to 2.5-fold reduction of their healing time (V. A. Baraboy). At the Kharkov Medical Radiology Scientific Research Institute under the supervision of V. I. Shantyr', a large study was conducted on the biological action of high-energy radiations and the radiation biochemistry of biopolymers (I. F. Paskevich). A. D. Rev's monograph "Ioniziruyushcheye izlucheniye i neyrokhimiya" [Ionizing Radiation and Neurochemistry] (1974) generalized the results of a study of the condition of proteins and of a number of enzyme systems, nu leic acids, phospholipids and microelements in the nervous system during irradiation which was conducted at the Biochemistry and Biophysics Department of the Dnepropetrovsk State University imeni 300th Anniversary of the Reunion of the Ukraine With Russia.

The processes of the concentration and action of radioactive substances in marine hydrobiological systems are studied at the Radiation and Chemical Biology Department of the UkSSR Academy of Sciences Institute of the Biology of Southern Seas (G. G. Polikarpov). Radiation-hygienic criteria and norms for the fleet and ship building industry and a methodology for evaluating the radiation environment have been developed. The scientific results of these developments were reflected in the monographs: "Radioekologiya morskikh organizmov, nakopleniye i biologicheskoye deystviye radioaktivnykh veshchestv" [Radioecology of Marine Organisms and the Accumulation and Biological Action of Radioactive Substances] (1964) by G. G. Polikarpov, "Estestvennyye i iskusstvennyye radionuklidy v zhizni gidrobiontov" [Natural and Artificial Radionuclides in the Life of Hydrobionts] (1973) by V. G. Tsypugina, N. S. Risik and G. E. Lazarenko and "Khemoradioekologiya pelagiali i bentali" [Chemoradioecology of Pelagic and Benthic Zones] (1975) by G. G. Polikarpov. The patterns of accumulation of radioactive isotopes in water, in substrates, in the benthos, in macrophytes, fish and in fresh waters are studied at the Biology Institute of Dnepropetrovsk State University. A. I. Danilenko's and I. N. Shevchenko's monograph "Prirodnaya β-radioaktivnost' rasteniy, zhivotnykh i cheloveka" [Natural β-Radioactivity of Plants, Animals and Man] (1981) presents the results of long-term investigations on the problem of natural radioactivity and its influence of anthropogenic contaminants.

The numerous studies of professor B. F. Sukhomlinov and his students (Lvov State University imeni I. Franko) are devoted to the effect of ionizing radiation on proteins in the animal organism. Of special interest among these studies are the investigations of radiation injury to the protein component of hemoglobin. Investigations have been conducted on early radiation-biochemical processes for a number of years at Kiev State University imeni T. G. Shevchenko under the supervision of Professor E. F. Sopin and, later, his student, Professor N. E. Kucherenko. Early radiational disruptions were found in the methylation, biosynthesis and structural-functional characteristics of tRNA. N. E. Kucherenko's and V. I. Mirutenko's manual "Osnovy molekulyarnoy radiobiologii" [Bases of Molecular Radiobiology] (1977) and N. E. Kucherenko's monograph "Biologicheskoye metilirovaniye i ego modifikatsiya v ranniy period luchevogo porazheniya" [Biological Methylation and Its Modification During the Early Period of Radiation Injury] (1980) were

published. Radiation dysfermentoses are studied at the Biochemistry Department of Odessa Medical Institute (I. V. Savitskiy). A differing susceptibility to injury was found in the enzymes of glycolysis and of the tricarboxylic acid cycle. A therapeutic complex was proposed.

In continuing to develop successfully fundamental theoretical investigations on the mechanism of the biological effect of ionizing radiation and in developing, on their basis, methods for radiation protection, Ukrainian radiobiologists have achieved substantial successes in the utilization of ionizing radiations in medicine and agriculture. Great, responsible tasks confront Ukrainian radiobiologists in connection with the accelerated development of atomic power plant construction and the expansion of studies on the use of nuclear radiations in agriculture, the food industry and medicine.

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ACUTE RADIATION DISEASE IN MAN DUE TO NONUNIFORM IRRADIATION AS A CLINICAL MODEL OF COMBINED RADIATION INJURIES; PROGNOSTIC ASPECTS

Moscow MEDITSINSKAYA RADIOLOGIYA in Russian Vol 27, No 11, Nov 82
(manuscript received 12 May 82) pp 41-44

BARABANOVA, A. V., BARANOV, A. Ye. and GUS'KOVA, A. K.

[Abstract] In this review-type article the possibilities for individual prognostication during nonuniform irradiation are analyzed, i.e. determination of the seriousness of each radiation syndrome acoording to early clinical and hematologic symptoms and the data on radiation parameters. During the first day of the disease, correct prognosis can be established in 50% of all cases; on the third day the correct prediction occurs in 67%, and this value is raised to 90% on the 8th day. Serious cases are diagnosed with best accuracy. General trends of medullary syndrome are maintained; clinical manifestations include febrile syndrome, increased infectious complications and manifestations of endogenous intoxication. In presence of I or II degree of medullary syndrome, severity of the overall condition may be determined from the extent of local damage. In cases of III and IV degree medullary syndrome along with severe local damage, mutual aggravation may be expected. References 9: 8 Russian, 1 Western.
[180-7813]

INCREASED RELIABILITY OF "HUMAN FACTOR" IN OPERATIONS. REVIEW OF THE PUBLICATION "PSYCHOPHYSIOLOGY OF THE OPERATOR IN HUMAN-MACHINE SYSTEMS" KIEV, NAUKOVA DUMKA, 1980, p 342

Kiev VISNYK AKADEMIYI NAUK UKRAYINS'KOYI RSR in Ukrainian No 8, Aug 82 pp 106-107

[Review by Doctor of Technical Sciences Pavlov, V. V.]

[Text] The monograph being reviewed represents a summary of the work of a team of authors headed by Doctor of Biological Sciences K. O, Ivanov-Muroms'kyy. It addresses current problems in psychophysiology, engineering psychology and ergonomics.

These sciences have been greatly expanded in recent times. In 1980 a school-seminar was organized in Odessa on the subject of ergonomics. The problems of sea transport ergonomics were addressed, but the discussions went beyond the scope of narrow specialties. The school-seminar participants concentrated their attention on methodological principles comparing several disciplines of engineering psychology and ergonomics.

Many of the problems have not been solved as yet, even though the 25th and 26th Congresses of the CPSS have stressed new potentials for productive research on theoretical, basic and applied levels, at the interface of various disciplines, especially those of biological and social sciences. After all, the concept of ergonomics in its present sense originated only recently in connection with the problems of human-machine-production environment continuously championed by the current phase of NTR [Scientific organization of labor?].

I have often suggested that a "human" and a "machine" are inseparable concepts*. Today this cohesiveness, as never before, demands a constant search for a theory of active, directive synthesis of all means of optimal union of humans and machines into a single functional system.

*cf. PAVLOV, V. V., Origins of the theory of ergonomic systems,-Kiev, Naukova Dumka, 1975 p. 340

The reviewed book brings considerable material to help solve these problems (the authors: K. O. Ivanov-Muroms'kyy, O. M. Luk'yanova, V. O. Chornomorets', K. V. Lyudvichek, V. Ye. Alekseyev and D. I. Chus').

This monograph covers a wide range of questions of interest to psychophysiologists, engineers, ergonomists, labor physiologists and engineering psychologists. In the foreword, doctor of biological sciences K. O, Ivanov-Muroms'kyy reports statistical data on the role of human factors in the systems human-machine. It is noted that only 8-16% of all the labor force in various production branches have psychophysiological characteristics required by their professions. This factor of inadequate correspondence is responsible for over 40% of traffic accidents, 65% of production trauma and for accidents in deep mining shafts and 80-90% of errors in the performance of thermal electricity generators; half of air accidents (according to foreign press reports) is due to improper construction of the airplanes related to psychophysiological potential of humans. Where does one search for the causes of such tragedies, how does one study and model the state of a human being in the system--these are the problems discussed by the authors of this book.

The volume starts with a review of the problems of human labor activities, methods of determining psychophysiological properties, social direction of an individual, description of the human-operator status in stress situations. The third chapter analyzes the evaluation of the activity of human operator, the fourth and fifth chapters generalize these results obtained both under experimental, semi-natural and production conditions. Interesting material was reported on the modelling of group activity of operators, methods for treating physiological information on the conditions of human operators working on specialized technical equipment.

The last chapter in the monograph covers the principles for the construction of complex bioelectronic systems which, according to bionics experts, represent one of the main thrusts of this science.

There are some weak points in this book. Like any other collective issue, it suffers from multiple styles. In addition, data from most recent years should have been reported in literature reviews along with critical evaluation. The problem of the expansion of the range of psychophysiological indicators for evaluation of the state of humans operating under stress conditions and possible methods of prognosticating such states, should have been discussed in greater detail.

These shortcomings could be corrected in the next edition of this book, to which a chapter should be added on the means and methods of directed influence on external receptors and depth mechanisms of central nervous system for normalizing the state of individuals under extreme conditions.
[14-7813]

UDC 616.89-07

DIAGNOSTIC INFORMATIVE CHARACTER OF SOME PATHOPSYCHOLOGIC SYMPTOM-COMPLEXES

Moscow ZHURNAL NEVROPATOLOGII I PSIKHIATRII IMENI S. S. KORSAKOVA in Russian
Vol 82, No 12, Dec 82 (manuscript received 1 Jun 82) pp 54-58

KUDRYAVTSEV, I. A., Laboratory of Psychology (Director I. A. Kudryavtsev), All Union Scientific Research Institute of General and Forensic Psychiatry imeni V. P. Serbskiy (Director Professor G. V. Morozov), Moscow

[Abstract] In an attempt to verify and enlarge the studies of pathokinetic dynamics, stability and diagnostic value of identified symptom-complexes, primary and secondary pathopsychologic and clinical data on 81 subjects were compared. The following conclusions were reached: these pathopsychologic symptom-complexes of the disturbance of recognition activities point out their nosologic nature and are valuable as diagnostic tools. Greatest diagnostic information intrinsic to schizophrenic and organic symptom-complexes of pathopsychologic disorders was less valuable in psychopatic states. The identified complexes showed different dynamic tendencies and varied in their stability. The greatest dynamics coupled with a tendency towards transitions and regressions were associated with the syndrome of psychogenic disorganization of mental activity; lowest dynamics and a tendency towards accumulation of pathopsychologic manifestations were typical of schizophrenic and organic symptom-complexes. References 11 (Russian). [156-7813]

EMERGENCY PSYCHOLOGICAL SERVICE IN LENINGRAD

Leningrad LENINGRADSKAYA PRAVDA in Russian 26 Jan 83 p 4

[Article: "A Psychologist Comes to Help"]

> [Text] Recently I was in Czechoslovakia and I learned that there exists in that nation a psychological first-aid service. I would like to know if such a form of care is planned for our city? M. Snimshchikova.
>
> This letter was answered at the request of our correspondent S. Vinogradova by Senior Psychologist of the city psychological-care clinic, V. P. Verbin:

My work day had already ended when the telephone rang. Raising the receiver, I heard an agitated male voice.

"Everything has collapsed for me." he said. "It couldn't be worse at work, and there is discord in the family. I no longer have the strength to bear this burden."

I invited him to my office. The conversation with Nikolay Vasil'yevich (we shall call him thus) lasted about two hours. It was necessary to help him in this critical moment of life to forget the bitterness of injuries and to find a morally-acceptable escape from the developed situation. This was not an easy, but a very open, conversation. When Nikolay Vasil'yevich left us he was no longer in such a dark mood, in any case nothing was said any more about hopelessness. In parting, he said: "Yes, not without reason is it said that a word cures."

Far from every person that finds himself in a complex, strained life situation possesses sufficient resources of will to cope with the difficulties confronting him. And here, for help, a friend is called, one who does not simply listen and sympathize but also advises how to go on living, helps in escaping from a situation of spiritual crisis. Not only spiritual generosity, wordly experience and an ability to empathize are required, but also the specific knowledge that is possessed by medical psychologists.

Such psychological first aid has already existed in our city for a year and a half. During this time, more than 12,000 people have turned to us. We were able to suggest to the overwhelming majority an intelligent means for overcoming conflicts arising at work, in the family, at school.

I want to stress: we do not replace either the legal or the therapeutic services, we do not give any drugs and do not write prescriptions. Our main task is to render to the people turning to us a concrete psychological assis-assistance and to raise the level of their psychological stability. Our clinic works, as is stipulated for a "Skoraya" [emergency unit] around the clock, not excluding Sundays and holidays. We do not demand documents from anyone, we do not ask for the family name, address--everyone who calls or comes to us has a right to complete anonymity. But at the same time, our clinic fills an active social position, and if the favorable resolution of a conflict situation requires the combined efforts of units of health care and law enforcement, then the clinical associate (with the agreement of the person turning to us for help) takes it upon himself to act as a kind of intermediary and assists in making contact with the necessary organizations.

If at a difficult moment in life you need friendly support, dial 232-05-54. A psychologist will come to your aid.

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